Stephen E. Hessler, P.C.
Mark McKane, P.C. (admitted *pro hac vice*)
Patrick Venter
KIRKLAND & ELLIS LLP
KIRKLAND & ELLIS INTERNATIONAL LLP
601 Lexington Avenue
New York, New York 10022
Telephone: (212) 446-4800
Facsimile: (212) 446-4900

Chad J. Husnick, P.C.
KIRKLAND & ELLIS LLP
KIRKLAND & ELLIS INTERNATIONAL LLP
300 North LaSalle Street
Chicago, Illinois 60654
Telephone: (312) 862-2000
Facsimile: (312) 862-2200

Co-Counsel to the Reorganized Debtors

Timothy R. Shannon (admitted *pro hac vice*)
Seth S. Coburn (admitted *pro hac vice*)
VERRILL DANA, LLP
One Portland Square
Portland, Maine 04101
Telephone: (207) 774-4000
Facsimile: (207) 774-7499

Co-Counsel to the Reorganized Debtors

UNITED STATES BANKRUPTCY COURT
SOUTHERN DISTRICT OF NEW YORK

In re:	)	Chapter 11
	)	
FRONTIER COMMUNICATIONS CORPORATION, *et al.*,[1]	))	Case No. 20-22476 (RDD)
	)	
Reorganized Debtors.	)	(Jointly Administered)
	)	

NOTICE OF REORGANIZED DEBTORS' OMNIBUS
OBJECTION TO CLAIMS ASSERTED BY INTELLECTUAL VENTURES II LLC

PLEASE TAKE NOTICE that on October 27, 2021, above captioned reorganized debtors

(before the effective date of their chapter 11 plan of reorganization, the "Debtors," and after the

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[1]   Due to the large number of debtor entities in these chapter 11 cases, for which the Court has ordered joint administration, a complete list of the debtor entities and the last four digits of their federal tax identification numbers are not provided herein. A complete list of such information may be obtained on the website of the Reorganized Debtors' claims and noticing agent at https://cases.primeclerk.com/ftr. The location of the Reorganized Debtors' service address for purposes of these chapter 11 cases is: 50 Main Street, Suite 1000, White Plains, New York 10606.

effective date of their chapter 11 plan of reorganization, the "Reorganized Debtors" or "Frontier")

filed the *Reorganized Debtors' Omnibus Objection to Claims Asserted by Intellectual Ventures II*

LLC (the "Objection").   A hearing (the "Hearing") on the Objection is requested for

November 17, 2021, at 10:00 a.m., prevailing Eastern Time. In accordance with General Order

M-543 dated March 20, 2020, the Hearing will be conducted telephonically unless otherwise

ordered.   Any parties wishing to participate must do so by making arrangements through

CourtSolutions by visiting https://www.court-solutions.com.

PLEASE TAKE FURTHER NOTICE that any responses or replies (each a "Response")

to the relief requested in the Objection must: (a) conform to the Federal Rules of Bankruptcy

Procedure, the Local Bankruptcy Rules for the Southern District of New York, and all General

Orders applicable to chapter 11 cases in the United States Bankruptcy Court for the Southern

District of New York (the "Bankruptcy Court"); and (b) be served so as to be actually received no

later than **November 10, 2021, at 4:00 p.m., prevailing Eastern Time** in a manner consistent

with the *Final Order Establishing Certain Notice, Case Management, and Administrative*

Procedures [Docket No. 390] (the "Case Management Order") and the procedures set forth therein

as Exhibit 1 (the "Case Management Procedures").

PLEASE TAKE FURTHER NOTICE that if no Responses are timely filed and served

with respect to the Objection, the Reorganized Debtors shall submit to the Bankruptcy Court an

order substantially in the form annexed as Exhibit A to the Objection, which order the Bankruptcy

Court may enter with no further notice or opportunity to be heard.

PLEASE TAKE FURTHER NOTICE that the Hearing may be continued or adjourned

thereafter from time to time without further notice other than an announcement of the adjourned

date or dates at the Hearing. The Reorganized Debtors will file an agenda before the Hearing, which agenda may modify or supplement the Objection to be heard at the Hearing.

PLEASE TAKE FURTHER NOTICE that a copy of the Objection and other pleadings filed in these chapter 11 cases may be obtained free of charge by visiting the website of Prime Clerk LLC at https://cases.primeclerk.com/ftr. You may also obtain copies of the Objection and other pleadings filed in these chapter 11 cases by visiting the Court's website at http://www.nysb.uscourts.gov in accordance with the procedures and fees set forth therein.

[*Remainder of page intentionally left blank*]

Dated: October 27, 2021   */s/ Timothy Shannon*
Portland, Maine   Timothy R. Shannon (admitted *pro hac vice*)
                                  Seth S. Coburn (admitted *pro hac vice*)
                                  VERRILL DANA, LLP
                                  One Portland Square
                                  Portland, Maine 04101
                                  Telephone: (207) 774-4000
                                  Facsimile: (207) 774-7499

                                  Co-Counsel to the Reorganized Debtors

                                  Stephen E. Hessler, P.C.
                                  Mark McKane, P.C. (admitted *pro hac vice*)
                                  Patrick Venter
                                  KIRKLAND & ELLIS LLP
                                  KIRKLAND & ELLIS INTERNATIONAL LLP
                                  601 Lexington Avenue
                                  New York, New York 10022
                                  Telephone: (212) 446-4800
                                  Facsimile: (212) 446-4900

                                  - and -

                                  Chad J. Husnick, P.C.
                                  KIRKLAND & ELLIS LLP
                                  KIRKLAND & ELLIS INTERNATIONAL LLP
                                  300 North LaSalle Street
                                  Chicago, Illinois 60654
                                  Telephone: (312) 862-2000
                                  Facsimile: (312) 862-2200

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601 Lexington Avenue
New York, New York 10022
Telephone: (212) 446-4800
Facsimile: (212) 446-4900

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KIRKLAND & ELLIS LLP
KIRKLAND & ELLIS INTERNATIONAL LLP
300 North LaSalle Street
Chicago, Illinois 60654
Telephone: (312) 862-2000
Facsimile: (312) 862-2200

Timothy R. Shannon (admitted *pro hac vice*)
Seth S. Coburn (admitted *pro hac vice*)
VERRILL DANA, LLP
One Portland Square
Portland, Maine 04101
Telephone: (207) 774-4000
Facsimile: (207) 774-7499

Co-Counsel to the Reorganized Debtors

UNITED STATES BANKRUPTCY COURT
SOUTHERN DISTRICT OF NEW YORK

In re:	))	Chapter 11
FRONTIER COMMUNICATIONS CORPORATION, *et al.*,[1]	))))	Case No. 20-22476 (RDD)
Reorganized Debtors.	)))	(Jointly Administered)

REORGANIZED DEBTORS' OMNIBUS
OBJECTION TO CLAIMS ASSERTED BY INTELLECTUAL VENTURES II LLC

---

[1]   Due to the large number of debtor entities in these chapter 11 cases, for which the Court has ordered joint administration, a complete list of the debtor entities and the last four digits of their federal tax identification numbers are not provided herein. A complete list of such information may be obtained on the website of the Reorganized Debtors' claims and noticing agent at https://cases.primeclerk.com/ftr. The location of the Reorganized Debtors' service address for purposes of these chapter 11 cases is: 50 Main Street, Suite 1000, White Plains, New York 10606.

THIS OBJECTION SEEKS TO DISCHARGE LIABILITY ASSERTED IN CERTAIN PROOFS OF CLAIM AND TO ESTABLISH A SCHEDULE FOR ADJUDICATING SUCH CLAIMS IN THE BANKRUPTCY COURT.

CLAIMANTS RECEIVING THIS OBJECTION SHOULD LOCATE THEIR NAMES AND THEIR CLAIMS IDENTIFIED ON <u>SCHEDULE 1</u> TO THE ORDER ATTACHED AS <u>EXHIBIT A</u> TO THIS OBJECTION.

The above-captioned reorganized debtors (collectively, "<u>Frontier</u>," or before the effective date of their plan of reorganization, the "<u>Debtors</u>," and after the effective date of their plan of reorganization, the "<u>Reorganized Debtors</u>") file this omnibus objection (this "<u>Objection</u>") with respect to each of the claims set forth on **Schedule 1** of **Exhibit A** attached hereto asserted by claimant Intellectual Ventures II LLC ("<u>IV</u>" and such claims, the "<u>IV Claims</u>") pursuant to section 502(b) of title 11 of the United States Code, 11 U.S.C. §§ 101–1532 (the "<u>Bankruptcy Code</u>"), rule 3007 of the Federal Rules of Bankruptcy Procedure (the "<u>Bankruptcy Rules</u>"), and the *Fifth Amended Joint Plan of Reorganization of Frontier Communications Corporation and its Debtor Affiliates Pursuant to Chapter 11 of the Bankruptcy Code* [Docket No. 984] (the "<u>Plan</u>").[2] The Reorganized Debtors may submit additional briefing and/or other evidence in support of this Objection in advance of a requested evidentiary hearing on the Objection in accordance with the Adjudication Schedule (defined below).

Relief Requested

1.   The IV Claims should be disallowed or, at the very least, reduced. IV has grossly overstated the extent of the Reorganized Debtors' liability, if any, for the alleged patent infringement asserted in the IV Claims. In particular, IV's damages theory is untethered to the

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[2]   Capitalized terms used but not defined herein shall have meanings set forth in the Plan or the *Findings of Fact, Conclusions of Law, and Order Confirming the Fifth Amended Joint Plan of Reorganization of Frontier Communications Corporation and its Debtor Affiliates Pursuant to Chapter 11 of the Bankruptcy Code* [Docket No. 1005] (the "<u>Confirmation Order</u>"), as applicable.

value of the asserted patents (even if they were standard-essential, valid, and infringed, as alleged), and IV has demanded royalties in orders of magnitude greater than what the patents could properly command.

2.   The Reorganized Debtors therefore request entry of an order, substantially in the form attached hereto as **Exhibit A** (the "Order") requiring that the IV Claims be adjudicated in a consolidated manner before the Bankruptcy Court.[3]   Specifically, the Reorganized Debtors request that the Bankruptcy Court bifurcate damages from liability, adjudicating damages first in order to conserve judicial and party resources and likely resolve the dispute expeditiously.

3.   In support of this Objection, the Reorganized Debtors respectfully state as follows:

Jurisdiction and Venue

4.   The Bankruptcy Court has jurisdiction over this matter pursuant to 28 U.S.C. §§ 157 and 1334 and the *Amended Standing Order of Reference from the United States District Court for the Southern District of New York*, dated January 31, 2012.   The Reorganized Debtors confirm their consent, pursuant to rule 7008 of the Bankruptcy Rules, to the Bankruptcy Court entering a final order in connection with this Objection to the extent that it is later determined that the Bankruptcy Court, absent consent of the parties, cannot enter final orders or judgments in connection herewith consistent with Article III of the United States Constitution.

5.   Venue is proper pursuant to 28 U.S.C. §§ 1408 and 1409.

6.   The statutory bases for the relief requested herein are sections 105(a), 502(b), 503, and 507 of the Bankruptcy Code, and Bankruptcy Rule 3007.

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[3]   Pursuant to the Plan, Proofs of Claim filed in these Chapter 11 Cases are considered objected to unless explicitly Allowed under the Plan . *See* Plan Art. VII.A ("Unless relating to a Claim expressly Allowed pursuant to the Plan, all Proofs of Claim filed in these Chapter 11 Cases shall be considered objected to and Disputed without further action by the Debtors.").   Notwithstanding, the Reorganized Debtors file this Objection to initiate the process of adjudicating the IV Claims in the Bankruptcy Court on a consolidated basis pursuant to the procedures for resolving disputed claims outlined in Article VII.A of the Plan, (the "Disputed Claims Process")s.

Background

Early History and Technology

7.   For many years, certain Debtors have offered their customers various telecommunications services. One of those services is known as Digital Subscriber Line ("xDSL"), a family of technologies dating to the late 1980's and 1990's, which facilitates fast data transmission over conventional "twisted pair" copper wire telephone lines to homes and businesses. Unlike dial-up modems, xDSL facilitates the simultaneous transmission of voice and data over existing voice lines, allowing continuously available broadband service.

8.   In the 1990's and early 2000's, companies and engineers in the telecommunications space collaborated to develop different types of xDSL technology, representing different bit-rates, different methods of modulating data onto carrier signals, different protocols, and other changes.

9.   In the early 2000's, industry collaborators at the International Telecommunications Union (ITU-T) (an industry-standard-setting body) issued a set of design recommendations (a/k/a "standards") for two particular versions of xDSL technology relevant to the instant dispute: ADSL2 and VDSL2. Each standard set forth literally thousands of specifications, protocols, data transmission techniques, network architectural details, and other communications   conventions   and   practices—essentially   a   technical guidebook/encyclopedia/specification for practicing ADSL2 or VDSL2. By publishing these comprehensive specifications, the ITU-T promoted interoperability among various industry players, so that devices made by different participating/adopting manufacturers could communicate with each other.

10.   Consistent with standard ITU-T practice, participants in the ITU-T collaboration process agreed at the time to (i) disclose to the ITU-T (and to their fellow collaborators) the existence of any intellectual property rights (*e.g.* patents) that *might* be implicated in the event that a particular collaborator's idea or contribution were adopted by the ITU-T; and (ii) license any such technology on a worldwide, non-discriminatory basis, on reasonable terms and conditions. At the same time, neither the ITU-T nor any contributor was required to confirm or prove that the contributor's patents would, in fact, be infringed.

11.   Beginning in about 2012, the Debtors began deploying third-party equipment that allowed them to provide their customers ADSL2 and VDSL2. Neither IV nor its predecessors in interest contacted Frontier regarding any patent infringement.

The Frontier Bankruptcy

12.   On April 14, 2020, each of the Debtors filed a voluntary petition for relief under chapter 11 of the Bankruptcy Code. A detailed description surrounding the facts and circumstances of these chapter 11 cases is set forth in the *Declaration of Carlin Adrianopoli, Executive Vice President of Strategic Planning, in Support o*f *Chapter 11 Petitions and First Day Motions* [Docket No. 3].

13.   On April 17, 2020, the Bankruptcy Court entered an order authorizing the joint administration and procedural consolidation of the Debtors' chapter 11 cases pursuant to Bankruptcy Rule 1015(b).

14.   On August 27, 2020, the Bankruptcy Court entered the Confirmation Order, which approved the Plan.

15.   On April 30, 2021 Frontier emerged from chapter 11, at which point the Debtors became the Reorganized Debtors.

The IV Claims

16.   Between August, 18, 2020, and August 25, 2020, Intellectual Ventures—a patent

assertion entity—filed identical Proofs of Claim against each of the Debtors asserting that the

Debtors had infringed five patents (U.S. Patent Nos. 6,647,068; 6.798,735; 7,272,171; 7,817,532;

and 8,369,275) (collectively, "Asserted Patents") during the prepetition period (such prepetition

claims, the "IV GUC Claims"). A full list of the IV GUC Claims is provided in **Schedule 1** to

Exhibit A attached hereto, and an exemplar Proof of Claim (against Debtor Frontier

Communications Corporation) is attached hereto as **Exhibit B** (the "Exemplar Claim").   IV

alleges that the relevant patents were standard-essential to the provision of ADSL2 and VDSL2

services, such that Frontier infringed them by means of using third-party equipment (itself

employing third-party chipsets) that practiced certain ITU-T telecommunications

protocols/standards (ITU-T G.992.3 and G.993.2) adopted by substantially all equipment

manufacturers. *See, e.g.*, Exemplar Claim at Addendum at 3, ¶ 9 (alleging infringement "through

Frontier's use of products implementing particular ITU-T standards"), *id.* at Addendum Ex. A

(claim chart comparing individual claims to the general standard, not to Frontier's equipment).

That is, IV alleges that any equipment that complied with the industry standards necessarily

infringed and Frontier is liable for such infringement. *Id.*

17.   IV contends that the prepetition damages should be calculated by reference to a

patent license agreement that had been executed by a "similarly situated competitor" carrier in

the wake of other litigation. Exemplar Claim at 3, ¶¶ 10-12. According to IV, based on this

"comparable" license from another telecommunications company, Frontier's alleged prepetition

infringement gives rise to royalty damages in the amount of $9,396,000. *Id.*

18.   On December 18, 2020, IV contacted Frontier indicating a desire to resolve the IV

GUC Claims but indicating that, in the event the IV GUC Claims could not be resolved, "IV

[would] seek adjudication by the Bankruptcy Court [and] the parties should work in good faith to

prepare an efficient resolution procedure and schedule that can be submitted to the Court."

Exhibit C (Letter from J. Plies to Frontier dated Dec. 18, 2020) (the "Inquiry Letter").

19.   In early 2021 counsel to the Debtors engaged in discussions with IV's counsel

regarding the IV GUC Claims and defenses thereto.

20.   On June 1, 2021, following Frontier's emergence from chapter 11, IV filed a

Request for Payment of Administrative Expense for Post-Petition Infringement of Patents Held

by Intellectual Ventures II LLC [Docket No. 1880] (the "IV Administrative Request"), which is

attached hereto as **Exhibit D**, and which requests payment of purported administrative expenses

based on the same theories of liability asserted in the IV GUC Claims, now for alleged

infringement that had taken place postpetition. IV Administrative Request at 3, ¶ 8 (identifying

two patents; the other three having expired prior to the Petition Date), *id.* at ¶ 9 (pointing to the

earlier prepetition claim charts).

21.   Like the IV GUC Claims, the IV Administrative Request alleges that that IV is

entitled to royalty damages calculated by reference to a patent license agreement executed by

another carrier in the wake of prior litigation. IV Administrative Request at 3, ¶¶ 10-12.

According to IV, Frontier's alleged postpetition infringement gives rise to royalty damages in the

amount of $1,699,102—allegedly based on a "comparable" license from another

telecommunications company (such license, the "Competitor License").

7

22.   The IV Administrative Request thus represents a continuation of the assertions set forth in the IV GUC Claims, presenting common issues of law and fact, as the IV Claims together represent one set of patent-infringement claims related to the same underlying activity, over time.

Recent Discussions and Status

23.   On July 30, 2021, the Reorganized Debtors filed the *Reorganized Debtors' Limited Objection and Reservation of Rights with Respect to Administrative Claims* [Docket No. 1952], which preserved the Reorganized Debtors' right to substantively dispute certain Administrative Claims, including the IV Administrative Claims, and the ability to have such Administrative Claims adjudicated in the Bankruptcy Court in the event that the parties were unable to reach a consensual resolution.

24.   The parties continued discussing the IV Claims but were unable to resolve their disputes, necessitating adjudication of the IV Claims by the Bankruptcy Court pursuant to the Disputed Claims Process.

25.   Counsel for IV has recently indicated that IV is amenable to the general adjudication process outlined below, even if IV disagrees with the substantive basis for the Reorganized Debtors' objection.

Objection

26.   This is a patent infringement lawsuit lodged in a bankruptcy proceeding. The IV Claims set forth patent infringement assertions that allegedly arise under 35 U.S.C. § 271 *et seq.* The underlying patent claims are meritless. The claimed damages are meritless. As such, the Reorganized Debtors believe the IV Claims should be disallowed or, at the very least, reduced.

Objection as to Liability

27.   As the patentee, IV bears the burden of proving patent infringement. "The patentee bears the burden of proving infringement by a preponderance of the evidence. If the patentee fails to meet that burden, the patentee loses regardless of whether the accused comes forward with any evidence to the contrary." *Creative Compounds, LLC v. Starmark Lab'ys*, 651 F.3d 1303, 1314 (Fed. Cir. 2011) (internal citation omitted).

28.   Frontier denies that it has infringed the identified claims of the Asserted Patents.

29.   Frontier denies that the identified claims of the Asserted Patents are standard-essential to ITU-T G.992.3 and G.993.2.

30.   Frontier denies that the claims of the Asserted Patents, even if standard-essential to ITU-T G.992.3 and G.993.2, are necessarily infringed by equipment that in other respects complies with the standards.

31.   Frontier further objects on the ground that the identified claims of the Asserted Patents are invalid over the prior art per 35 U.S.C. § 102, 103.

32.   Frontier further objects on the ground that the IV Claims do not fully state legal claims upon which relief may be granted.

33.   Frontier reserves all other objections as to liability, including any affirmative defenses made manifest during discovery.

Objection as to Damages

34.   IV bears the burden of proving damages. *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1324 (Fed. Cir. 2009) ("The burden of proving damages falls on the patentee.") (citing *Dow Chem. Co. v. Mee Indus., Inc.*, 341 F.3d 1370, 1381 (Fed.Cir.2003)).

35.   IV grossly overstates the extent of the Reorganized Debtors' liability, if any, for the patent infringement alleged in the IV Claims. In particular, IV has advanced a damages theory untethered to the value of the asserted patents (even if they were standard-essential, valid, and infringed, as alleged) and demanded royalties that are orders of magnitude greater than the royalties the patents could properly command.

36.   As an initial matter, IV's damages claim is built upon a comparison to an allegedly "similarly situated" telecommunications company. That "similarly situated" company was not, in fact, similarly situated. The competitor in question was a different company, facing 19 patents, covering a broader range of technologies, with longer remaining lifespans, at a time when the technology was more relevant. Frontier here is facing a narrower set of patents, a narrower set of technologies, in a different market, with a different damages window. The parties are simply not similarly situated.

37.   Further, the Competitor License to which IV points is a post-litigation license that concerned and licensed many more—indeed, upon information and belief, *thousands* more—patents than are at issue here. The "price" set forth in the Competitor License and pressed here as an analogue is simply not analogous. The multi-patent Competitor License is different in kind and scope than the five-patent lawsuit pressed here. IV contends that Frontier should pay as much for the five asserted patents as the "similarly situated" company paid for hundreds or thousands of patents covering a range of technologies.

38.   Finally, IV has misunderstood and overstated the number of relevant Frontier customers, which further limits damages, to the extent any could be awarded.

39.   In sum, even if IV's damages framework were analytically sound, the foregoing factual errors and incorrect assumptions would result in a small fraction of the asserted damages.

40.   The foregoing assumes IV's damages framework is analytically sound. It is not. As will be developed and presented at any evidentiary hearing, the proper framework for assessing damages here—assuming the patents are valid, standard-essential, and infringed as alleged – is a so-called "fair reasonable and non-discriminatory" ("FRAND") rate as required by IV's obligations to the ITU-T as successor-in-interest to the original patent owner, Aware, Inc. Because the Asserted Patents govern a tiny fraction of the overall ITU-T standards in question, IV would be entitled only to a tiny fraction of the amount of overall royalty attributable to the standards.

41.   IV has breached its contractual obligation to the ITU by discriminating among licensees, charging different rates, and proposing an outrageously high rate. Frontier is a third-party beneficiary of that contract. IV's breach has resulted in damages to Frontier in the form of attorneys' fees in connection with the instant objection, and Frontier reserves all rights to assert applicable counterclaims against IV.

The Bankruptcy Court Should Approve the Adjudication Schedule

42.   The parties are in agreement that some form of adjudication is necessary. *See, e.g.,* Inquiry Letter ("IV will seek adjudication by the Bankruptcy Court [and] the parties should work in good faith to prepare an efficient resolution procedure and schedule that can be submitted to the Court.").

43.   Such adjudication is permitted under the Disputed Claims Process, which states that "Claims that the Debtors seek to have determined by the Bankruptcy Court, shall in all cases be determined by the Bankruptcy Court, if not otherwise resolved through settlement with the applicable claimant." Plan, Art. VII.A.

44.   Although the parties have not yet been able to reach agreement on a precise

schedule, and the Reorganized Debtors are amenable to considering constructive modifications

to the Adjudication Schedule in advance of the hearing on this Objection, the Reorganized

Debtors believe the schedule outlined herein and in **Schedule 2** to the Order

(the "Adjudication Schedule"), is reasonable and will facilitate an efficient and fair reconciliation

of the IV Claims.

45.   The Reorganized Debtors respectfully request that the Bankruptcy Court adopt the

Adjudication Schedule to adjudicate all of the IV Claims on a consolidated basis.

46.   In the interest of preserving court and party resources, the Reorganized Debtors

propose that the Court bifurcate damages from liability and address damages first. The

Reorganized Debtors do not concede liability (*i.e.* validity and infringement) but recognize that

adjudication of liability would require substantial party and judicial resources, whereas the

adjudication of damages is comparatively discrete and may be addressed first, on its own. Further,

given the merits of the damages case, the Reorganized Debtors believe it is likely that the

Bankruptcy Court's determination of the proper measure of damages will precipitate settlement,

or at the very least help scale any additional proceedings to match the potential amount in dispute.

47.   The Reorganized Debtors propose the Adjudication Schedule below, which will

facilitate the adjudication and resolution of the IV Claims before the Bankruptcy Court in an

efficient manner:

Date	Event
October 27, 2021	Frontier's Omnibus Objection to the IV Claims.
Nov. 10, 2021 (or the date that is seven days before the hearing on the Objection)[4]	Deadline for IV's Response to Frontier's Omnibus Objection.
Nov. 17, 2021 at 10:00 a.m. Prevailing Eastern Time (or a date and time to be set by the Bankruptcy Court)	Initial Hearing to be treated as Status / Scheduling Conference
Nov. 22, 2021	Parties to make initial disclosures of persons likely to have discoverable information, substantially per Fed. R. Civ. P. 26(a)(1)
Nov. 22, 2021	IV to serve infringement contentions for each asserted claim of each Asserted Patent, in substantially the same form and level of detail as in the IV GUC Claims.
Dec. 15, 2021	Mutual disclosure of fact witnesses to provide testimony at trial (with a maximum of 4 fact witnesses per side).
Jan. 15, 2022	Parties shall substantially complete all document production in response to document requests.
Feb. 14, 2022	The parties shall complete all fact discovery, including all fact depositions of any third parties.
Feb. 28, 2022	IV opening damages expert report per Fed.R.Civ.P. 26
Mar. 20, 2022	Frontier responsive damages expert report per Fed.R.Civ.P. 26
April 6, 2022	Completion of expert discovery/depositions of IV expert(s)
April 15, 2022	Completion of expert discovery/depositions of Frontier expert(s)
April 29, 2022	Parties to file pretrial briefs, which shall not exceed 25 pages.
May 10-11, 2022	Evidentiary hearing on the IV Claims.

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[4]   The Reorganized Debtors reserve their right to file an optional reply to any Response to the Objection, one day before the hearing pursuant to the procedures established in the *Final Order Establishing Certain Notice, Case Management, and Administrative Procedures* [Docket No. 390] (the "Case Management Order") and the procedures set forth therein as Exhibit 1 (the "Case Management Procedures").

48.   In the event the Bankruptcy Court's finding as to damages at the evidentiary hearing does not precipitate settlement, the Reorganized Debtors anticipate seeking the Court's assistance in scheduling mediation and, if necessary, a further evidentiary hearing on liability.

Discovery Limitations

49.   The parties will require limited discovery in connection with the IV Claims. In order to proceed efficiently, the Reorganized Debtors request that the Bankruptcy Court impose the following limitations:

a.   Unless otherwise stated herein or elsewhere by the Bankruptcy Court, the Federal Rules of Civil procedure shall govern discovery.

b.   Unless otherwise agreed by the parties in writing, discovery responses shall be due 14 days after service.

c.   Any deposition notice propounded pursuant to Fed. R. Civ. P. 30(b)(6) shall be limited to 5 categories with no subparts.

d.   For each side, there is a maximum of 5 requests for admission, 10 requests for production of documents, and 10 interrogatories.

e.   Documents shall be produced, when not in native format, as single-page Tagged Image File Format ("TIFFs") with standard load file and reasonably available metadata, the parties to work in good faith to resolve any disagreements as to relevant metadata fields.

Reservation of Rights

50.   Nothing contained in this Objection or any actions taken pursuant to any order granting the relief requested by this Objection is intended or should be construed as: (a) an admission as to the validity of any particular claim against a Reorganized Debtor entity;

(b) a waiver of the Reorganized Debtors' rights to dispute any particular claim on any grounds whatsoever; (c) a promise or requirement to pay any particular claim; (d) an implication or admission that any particular claim is of a type specified or defined in the Objection or any order granting the relief requested by this Objection; (e) a request or authorization to assume any prepetition agreement, contract, or lease pursuant to section 365 of the Bankruptcy Code; or (f) a waiver or limitation of the Reorganized Debtors' rights under the Bankruptcy Code or any other applicable law.   The Reorganized Debtors expressly reserve their right to amend and/or supplement this Objection to the extent more defenses and grounds for objections are learned in discovery or otherwise.

Separate Contested Matter

51.   To the extent that a response is filed regarding any IV Claim and to the extent the Reorganized Debtors are unable to resolve any such response, each such IV Claim, and the Objection as it pertains to such IV Claim, will constitute a separate contested matter as contemplated by Bankruptcy Rule 9014 and the Disputed Claims Process; *provided* that, notwithstanding the foregoing, these separate matters will be adjudicated in a consolidated proceeding before the Bankruptcy Court. Further, the Reorganized Debtors request that any order entered by the Bankruptcy Court regarding an objection or other reply asserted in response to this Objection be deemed a separate order with respect to each IV Claim.

Notice

52.   Notice of this Objection will be provided in accordance with the Case Management Order. The Reorganized Debtors submit that, in light of the nature of the relief requested, no other or further notice need be given.

<u>No Prior Request</u>

53.   No prior request for the relief sought in this Objection has been made to this or

any other court.

[Remainder of page intentionally left blank]

Dated: October 27, 2021
Portland, Maine

/s/ Timothy Shannon

Timothy R. Shannon (admitted *pro hac vice*)
Seth S. Coburn (admitted *pro hac vice*)
VERRILL DANA, LLP
One Portland Square
Portland, Maine 04101
Telephone: (207) 774-4000
Facsimile: (207) 774-7499

Co-Counsel to the Reorganized Debtors

Stephen E. Hessler, P.C.
Mark McKane, P.C. (admitted *pro hac vice*)
Patrick Venter
KIRKLAND & ELLIS LLP
KIRKLAND & ELLIS INTERNATIONAL LLP
601 Lexington Avenue
New York, New York 10022
Telephone: (212) 446-4800
Facsimile: (212) 446-4900

- and -

Chad J. Husnick, P.C.
KIRKLAND & ELLIS LLP
KIRKLAND & ELLIS INTERNATIONAL LLP
300 North LaSalle Street
Chicago, Illinois 60654
Telephone: (312) 862-2000
Facsimile: (312) 862-2200

Co-Counsel to the Reorganized Debtors

17

Exhibit A

Proposed Order

UNITED STATES BANKRUPTCY COURT
SOUTHERN DISTRICT OF NEW YORK

In re:	)
	) Chapter 11
	)
FRONTIER COMMUNICATIONS	) Case No. 20-22476 (RDD)
CORPORATION, *et al.*,[1]	)
	)
Reorganized Debtors.	) (Jointly Administered)
	)

ORDER GRANTING
REORGANIZED DEBTORS' OMNIBUS OBJECTION
TO CLAIMS ASSERTED BY INTELLECTUAL VENTURES II LLC AND/OR
ESTABLISHING AN ADJUDICATION SCHEDULE ASSOCIATED THEREWITH

Upon the objection (the "Objection")[2] of the above-captioned reorganized debtors

(collectively, the "Reorganized Debtors") for entry of an order (this "Order") discharging each of

the IV Claims and/or establishing an adjudication schedule related thereto, all as more fully set

forth in the Objection; and this Court having jurisdiction over this matter pursuant to 28 U.S.C.

§§ 157 and 1334 and the *Amended Standing Order of Reference from the United States District*

Court for the Southern District of New York, dated January 31, 2012; and this Court having the

power to enter a final order consistent with Article III of the United States Constitution; and this

Court having found that venue of this proceeding and the Objection in this district is proper

pursuant to 28 U.S.C. §§ 1408 and 1409; and this Court having found that the

Reorganized Debtors' notice of the Objection and opportunity for a hearing on the Objection were

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[1]   Due to the large number of debtor entities in these chapter 11 cases, for which the Court has ordered joint administration, a complete list of the debtor entities and the last four digits of their federal tax identification numbers are not provided herein. A complete list of such information may be obtained on the website of the Reorganized Debtors' claims and noticing agent at https://cases.primeclerk.com/ftr. The location of the Reorganized Debtors' service address for purposes of these chapter 11 cases is: 50 Main Street, Suite 1000, White Plains, New York 10606.

[2]   Capitalized terms used but not otherwise defined herein have the meanings ascribed to them in the Objection.

appropriate under the circumstances and no other notice need be provided; and this Court having

reviewed the Objection and having heard the statements in support of the relief requested therein

at a hearing before this Court (the "Hearing"), if any; and this Court having determined that the

legal and factual bases set forth in the Objection and at the Hearing, if any, establish just cause for

the relief granted herein; and upon all of the proceedings had before this Court; and after due

deliberation and sufficient cause appearing therefor, it is HEREBY ORDERED THAT:

1.   The Objection is sustained as set forth herein.

2.   The IV Claims identified on **Schedule 1** to this Order shall be treated as follows:

     a. Any IV Claims held by claimants who have not filed a timely response to the Objection are hereby discharged, and the Reorganized Debtors are determined to have no liability associated therewith;

     b. Any IV Claims held by claimants who have filed a timely response to the Objection shall be adjudicated according to the Adjudication Schedule attached hereto as **Schedule 2**, subject to modification by the Bankruptcy Court or by agreement of the parties and consent of the Bankruptcy Court.

3.   Prime Clerk LLC, as the Reorganized Debtors' Claims, Noticing, and Solicitation

Agent, is hereby authorized and directed to update the Claims Register to reflect the relief granted

in this Order.

4.   Nothing in this Order or any actions taken pursuant to this Order or any other order

granting the relief requested by the Objection shall be deemed or construed as: (a) an admission

as to the validity of any particular claim against a Reorganized Debtor entity; (b) a waiver of the

Reorganized Debtors' rights to dispute any particular claim on any grounds whatsoever; (c) a

promise or requirement to pay any particular claim; (d) an implication or admission that any

particular claim is of a type specified or defined in the Objection or any order granting the relief

requested by this Order as related to the Objection; (e) a request or authorization to assume any

prepetition agreement, contract, or lease pursuant to section 365 of the Bankruptcy Code; or (f) a

waiver or limitation of the Reorganized Debtors' rights under the Bankruptcy Code or any other

applicable law.

5.   To the extent a response to the Objection is filed regarding any IV Claim, each

such IV Claim, and the Objection as it pertains to such IV Claim, will constitute a separate

contested matter as contemplated by Bankruptcy Rule 9014, and this Order will be deemed a

separate order with respect to each IV Claim; *provided* that, notwithstanding the foregoing, these

separate matters will be adjudicated in a consolidated proceeding before this Court.

6.   The Reorganized Debtors are authorized to take all actions necessary to effectuate

the relief granted in this Order in accordance with the Objection.

7.   Notice of the Objection, as provided therein, shall be deemed good and sufficient

notice of the Objection, and the requirements set forth in rule 9013-1(b) of the Local Rules for the

United States Bankruptcy Court for the Southern District of New York are satisfied.

8.   This Court retains exclusive jurisdiction with respect to all matters arising from or

related to the implementation, interpretation, and enforcement of this Order.

9.   Notwithstanding the relief granted in this Order and any actions taken pursuant to

such relief, nothing in this Order shall preclude the Reorganized Debtors from objecting to any

IV Claim on any other basis, and nothing in this Order shall alter any party's rights to advance any

argument or defense before this Court in relation to any of the IV Claims.

White Plains, New York
Dated: _____, 2021

_____
THE HONORABLE ROBERT D. DRAIN
UNITED STATES BANKRUPTCY JUDGE

Schedule 1 (IV Claims)

IV GUC Claims

	Claimant	Claim #	Date Filed	Asserted Unsecured Claim Amount
1	Intellectual Ventures II LLC	2365	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
2	Intellectual Ventures II LLC	2366	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
3	Intellectual Ventures II LLC	2367	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
4	Intellectual Ventures II LLC	2371	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
5	Intellectual Ventures II LLC	2401	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
6	Intellectual Ventures II LLC	2407	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
7	Intellectual Ventures II LLC	2415	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
8	Intellectual Ventures II LLC	2433	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
9	Intellectual Ventures II LLC	2453	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
10	Intellectual Ventures II LLC	2461	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
11	Intellectual Ventures II LLC	2469	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
12	Intellectual Ventures II LLC	2472	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
13	Intellectual Ventures II LLC	2513	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000

	Claimant	Claim #	Date Filed	Asserted Unsecured Claim Amount
14	Intellectual Ventures II LLC	2514	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
15	Intellectual Ventures II LLC	2519	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
16	Intellectual Ventures II LLC	2521	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
17	Intellectual Ventures II LLC	2526	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
18	Intellectual Ventures II LLC	2529	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
19	Intellectual Ventures II LLC	2532	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
20	Intellectual Ventures II LLC	2535	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
21	Intellectual Ventures II LLC	2536	Aug. , 2020	Together, with all other IV GUC Claims: $9,396,000
22	Intellectual Ventures II LLC	2538	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
23	Intellectual Ventures II LLC	2539	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
24	Intellectual Ventures II LLC	2540	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
25	Intellectual Ventures II LLC	2541	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
26	Intellectual Ventures II LLC	2542	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
27	Intellectual Ventures II LLC	2543	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000

	Claimant	Claim #	Date Filed	Asserted Unsecured Claim Amount
28	Intellectual Ventures II LLC	2544	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
29	Intellectual Ventures II LLC	2545	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
30	Intellectual Ventures II LLC	2547	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
31	Intellectual Ventures II LLC	2548	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
32	Intellectual Ventures II LLC	2549	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
33	Intellectual Ventures II LLC	2551	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
34	Intellectual Ventures II LLC	2552	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
35	Intellectual Ventures II LLC	2553	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
36	Intellectual Ventures II LLC	2554	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
37	Intellectual Ventures II LLC	2555	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
38	Intellectual Ventures II LLC	2556	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
39	Intellectual Ventures II LLC	2557	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
40	Intellectual Ventures II LLC	2558	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
41	Intellectual Ventures II LLC	2559	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000

	Claimant	Claim #	Date Filed	Asserted Unsecured Claim Amount
42	Intellectual Ventures II LLC	2562	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
43	Intellectual Ventures II LLC	2563	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
44	Intellectual Ventures II LLC	2564	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
45	Intellectual Ventures II LLC	2566	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
46	Intellectual Ventures II LLC	2567	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
47	Intellectual Ventures II LLC	2568	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
48	Intellectual Ventures II LLC	2570	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
49	Intellectual Ventures II LLC	2571	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
50	Intellectual Ventures II LLC	2572	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
51	Intellectual Ventures II LLC	2574	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
52	Intellectual Ventures II LLC	2575	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
53	Intellectual Ventures II LLC	2577	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
54	Intellectual Ventures II LLC	2579	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
55	Intellectual Ventures II LLC	2580	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000

	Claimant	Claim #	Date Filed	Asserted Unsecured Claim Amount
56	Intellectual Ventures II LLC	2581	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
57	Intellectual Ventures II LLC	2582	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
58	Intellectual Ventures II LLC	2583	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
59	Intellectual Ventures II LLC	2584	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
60	Intellectual Ventures II LLC	2585	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
61	Intellectual Ventures II LLC	2586	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
62	Intellectual Ventures II LLC	2587	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
63	Intellectual Ventures II LLC	2588	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
64	Intellectual Ventures II LLC	2589	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
65	Intellectual Ventures II LLC	2590	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
66	Intellectual Ventures II LLC	2591	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
67	Intellectual Ventures II LLC	2592	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
68	Intellectual Ventures II LLC	2593	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
69	Intellectual Ventures II LLC	2594	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000

	Claimant	Claim #	Date Filed	Asserted Unsecured Claim Amount
70	Intellectual Ventures II LLC	2597	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
71	Intellectual Ventures II LLC	2598	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
72	Intellectual Ventures II LLC	2599	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
73	Intellectual Ventures II LLC	2600	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
74	Intellectual Ventures II LLC	2601	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
75	Intellectual Ventures II LLC	2602	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
76	Intellectual Ventures II LLC	2603	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
77	Intellectual Ventures II LLC	2606	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
78	Intellectual Ventures II LLC	2607	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
79	Intellectual Ventures II LLC	2608	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
80	Intellectual Ventures II LLC	2609	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
81	Intellectual Ventures II LLC	2610	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
82	Intellectual Ventures II LLC	2611	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
83	Intellectual Ventures II LLC	2612	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000

	Claimant	Claim #	Date Filed	Asserted Unsecured Claim Amount
84	Intellectual Ventures II LLC	2615	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
85	Intellectual Ventures II LLC	2616	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
86	Intellectual Ventures II LLC	2617	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
87	Intellectual Ventures II LLC	2618	Aug. 18, 2020	Together, with all other IV GUC Claims: $9,396,000
88	Intellectual Ventures II LLC	2619	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
89	Intellectual Ventures II LLC	2621	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
90	Intellectual Ventures II LLC	2622	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
91	Intellectual Ventures II LLC	2624	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
92	Intellectual Ventures II LLC	2625	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
93	Intellectual Ventures II LLC	2626	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
94	Intellectual Ventures II LLC	2627	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
95	Intellectual Ventures II LLC	2628	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
96	Intellectual Ventures II LLC	2630	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
97	Intellectual Ventures II LLC	2631	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000

	Claimant	Claim #	Date Filed	Asserted Unsecured Claim Amount
98	Intellectual Ventures II LLC	2632	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
99	Intellectual Ventures II LLC	2633	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
100	Intellectual Ventures II LLC	2634	Aug. 19, 2020	Together, with all other IV GUC Claims: $9,396,000
101	Intellectual Ventures II LLC	2671	Aug. 25, 2020	Together, with all other IV GUC Claims: $9,396,000

IV Administrative Claims

	Claimant	Claim #	Date Filed	Asserted Unsecured Claim Amount
1	Intellectual Ventures II LLC	*Request for Payment of Administrative Expense for Post-Petition Infringement of Patents Held by Intellectual Ventures II LLC* [Docket No. 1880]	June 1, 2021	$1,699,102

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Schedule 2 (Adjudication Schedule & Discovery Limitations)

Adjudication Schedule

Date	Event
October 27, 2021	Frontier's Omnibus Objection to the IV Claims.
Nov. 10, 2021 (or the date that is seven days before the hearing on the Objection)[1]	Deadline for IV's Response to Frontier's Omnibus Objection.
Nov. 17, 2021 at 10:00 a.m. Prevailing Eastern Time (or a date and time to be set by the Bankruptcy Court)	Initial Hearing to be treated as Status / Scheduling Conference
Nov. 22, 2021	Parties to make initial disclosures of persons likely to have discoverable information, substantially per Fed. R. Civ. P. 26(a)(1)
Nov. 22, 2021	IV to serve infringement contentions for each asserted claim of each Asserted Patent, in substantially the same form and level of detail as in the IV GUC Claims.
Dec. 15, 2022	Mutual disclosure of fact witnesses to provide testimony at trial (with a maximum of 4 fact witnesses per side).
Jan. 15, 2022	Parties shall substantially complete all document production in response to document requests.
Feb. 14, 2022	The parties shall complete all fact discovery, including all fact depositions of any third parties.
Feb. 28, 2022	IV opening damages expert report per Fed.R.Civ.P. 26
Mar. 20, 2022	Frontier responsive damages expert report per Fed.R.Civ.P. 26
April 6, 2022	Completion of expert discovery/depositions of IV expert(s)
April 15, 2022	Completion of expert discovery/depositions of Frontier expert(s)
April 29, 2022	Parties to file pretrial briefs, which shall not exceed 25 pages.
May 10-11, 2022	Evidentiary hearing on the IV Claims.

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[1]   The Reorganized Debtors reserve their right to file an optional reply to any Response to the Objection, one day before the hearing pursuant to the procedures established in the *Final Order Establishing Certain Notice, Case Management, and Administrative Procedures* [Docket No. 390] and the procedures set forth therein as Exhibit 1.

Discovery Limitations

a.   Unless otherwise stated herein or elsewhere by the Court, the Federal Rules of Civil

procedure shall govern discovery.

b.   Unless otherwise agreed by the parties in writing, discovery responses shall be due 14 days

after service.

c.   Any deposition notice propounded pursuant to Fed. R. Civ. P. 30(b)(6) shall be limited to

5 categories with no subparts.

d.   For each side, there is a maximum of 5 requests for admission, 10 requests for production

of documents, and 10 interrogatories.

e.   Documents shall be produced, when not in native format, as single-page TIFFs with

standard load file and reasonably available metadata, the parties to work in good faith to

resolve any disagreements as to relevant metadata fields.

<u>Exhibit B</u>

Exemplar Claim

United States Bankruptcy Court, Southern District of New York

Fill in this information to identify the case (Select only one Debtor per claim form):

Debtor: Frontier Communications Corporation (20-22476)

Official Form 410

Proof of Claim
04/19

Read the instructions before filling out this form. This form is for making a claim for payment in a bankruptcy case. Do not use this form to make a request for payment of an administrative expense (other than a claim entitled to priority under 11 U.S.C. § 503(b)(9)). Make such a request according to 11 U.S.C. § 503.

Filers must leave out or redact information that is entitled to privacy on this form or on any attached documents. Attach redacted copies of any documents that support the claim, such as promissory notes, purchase orders, invoices, itemized statements of running accounts, contracts, judgments, mortgages, and security agreements. **Do not send original documents;** they may be destroyed after scanning. If the documents are not available, explain in an attachment.

A person who files a fraudulent claim could be fined up to $500,000, imprisoned for up to 5 years, or both. 18 U.S.C. §§ 152, 157, and 3571.

Fill in all the information about the claim as of the date the case was filed. That date is on the notice of bankruptcy (Form 309) **that you received.**

Part 1:	Identify the Claim

1.	**Who is the current creditor?**	Intellectual Ventures II LLC
		Name of the current creditor (the person or entity to be paid for this claim)
		Other names the creditor used with the debtor

2.	**Has this claim been acquired from someone else?**	☒ No
		☐ Yes. From whom?

3.	**Where should notices and payments to the creditor be sent?**	**Where should notices to the creditor be sent?**	**Where should payments to the creditor be sent?** (if different)
	Federal Rule of Bankruptcy Procedure (FRBP) 2002(g)	c/o Dechert LLP Attn.: Brett Stone Three Bryant Park 1095 Avenue of the Americas New York, NY 10036-6797	Amelia Buharin c/o Intellectual Ventures Attn: Accounts Payable Manager 3150 139th Ave SE Bellevue, WA 98005
		Contact phone 212-698-3500	Contact phone 425-467-2300
		Contact email brett.stone@dechert.com	Contact email abuharin@intven.com

4.	**Does this claim amend one already filed?**	☒ No
		☐ Yes. Claim number on court claims registry (if known)_____ Filed on ____ / ____ / _____ MM / DD / YYYY

5.	**Do you know if anyone else has filed a proof of claim for this claim?**	☒ No
		☐ Yes. Who made the earlier filing?

Claim Number: 2526   **Proof of Claim**   page 1

Part 2:	Give Information About the Claim as of the Date the Case Was Filed

6. Do you have any number you use to identify the debtor?

[X] No

[ ] Yes. Last 4 digits of the debtor's account or any number you use to identify the debtor: ____ ____ ____ ____

7. How much is the claim?

$ 9,396,000.00 . **Does this amount include interest or other charges?**

[X] No

[ ] Yes. Attach statement itemizing interest, fees, expenses, or other charges required by Bankruptcy Rule 3001(c)(2)(A).

8. What is the basis of the claim?

Examples: Goods sold, money loaned, lease, services performed, personal injury or wrongful death, or credit card.

Attach redacted copies of any documents supporting the claim required by Bankruptcy Rule 3001(c).

Limit disclosing information that is entitled to privacy, such as health care information.

Patent infringement - see Addendum

9. Is all or part of the claim secured?

[X] No

[ ] Yes. The claim is secured by a lien on property.

Nature of property:

[ ] Real estate. If the claim is secured by the debtor's principal residence, file a *Mortgage Proof of Claim Attachment* (Official Form 410-A) with this *Proof of Claim.*

[ ] Motor vehicle

[ ] Other. Describe: _____

Basis for perfection: _____

Attach redacted copies of documents, if any, that show evidence of perfection of a security interest (for example, a mortgage, lien, certificate of title, financing statement, or other document that shows the lien has been filed or recorded.)

Value of property: $_____

Amount of the claim that is secured: $_____

Amount of the claim that is unsecured: $_____ (The sum of the secured and unsecured amounts should match the amount in line 7.)

Amount necessary to cure any default as of the date of the petition: $_____

Annual Interest Rate (when case was filed)_____%

[ ] Fixed

[ ] Variable

10. Is this claim based on a lease?

[X] No

[ ] Yes. **Amount necessary to cure any default as of the date of the petition.** $_____

11. Is this claim subject to a right of setoff?

[X] No

[ ] Yes. Identify the property: _____

		Amount entitled to priority

12. **Is all or part of the claim entitled to priority under 11 U.S.C. § 507(a)?**

A claim may be partly priority and partly nonpriority. For example, in some categories, the law limits the amount entitled to priority.

☒ No

☐ Yes. *Check one:*

☐ Domestic support obligations (including alimony and child support) under 11 U.S.C. § 507(a)(1)(A) or (a)(1)(B). $_____

☐ Up to $3,025* of deposits toward purchase, lease, or rental of property or services for personal, family, or household use. 11 U.S.C. § 507(a)(7). $_____

☐ Wages, salaries, or commissions (up to $13,650*) earned within 180 days before the bankruptcy petition is filed or the debtor's business ends, whichever is earlier. 11 U.S.C. § 507(a)(4). $_____

☐ Taxes or penalties owed to governmental units. 11 U.S.C. § 507(a)(8). $_____

☐ Contributions to an employee benefit plan. 11 U.S.C. § 507(a)(5). $_____

☐ Other. Specify subsection of 11 U.S.C. § 507(a)(   ) that applies. $_____

* Amounts are subject to adjustment on 4/01/22 and every 3 years after that for cases begun on or after the date of adjustment.

13. **Is all or part of the claim entitled to administrative priority pursuant to 11 U.S.C. § 503(b)(9)?**

☒ No

☐ Yes. **Indicate the amount of your claim arising from the value of any goods received by the Debtor within 20 days before the date of commencement of the above case, in which the goods have been sold to the Debtor in the ordinary course of such Debtor's business. Attach documentation supporting such claim.** $_____

Part 3:   Sign Below

The person completing this proof of claim must sign and date it. FRBP 9011(b).

If you file this claim electronically, FRBP 5005(a)(2) authorizes courts to establish local rules specifying what a signature is.

A person who files a fraudulent claim could be fined up to $500,000, imprisoned for up to 5 years, or both. 18 U.S.C. §§ 152, 157, and 3571.

Check the appropriate box:

☐   I am the creditor.

☒   I am the creditor's attorney or authorized agent.

☐   I am the trustee, or the debtor, or their authorized agent. Bankruptcy Rule 3004.

☐   I am a guarantor, surety, endorser, or other codebtor. Bankruptcy Rule 3005.

I understand that an authorized signature on this *Proof of Claim* serves as an acknowledgment that when calculating the amount of the claim, the creditor gave the debtor credit for any payments received toward the debt.

I have examined the information in this *Proof of Claim* and have a reasonable belief that the information is true and correct.

I declare under penalty of perjury that the foregoing is true and correct.

Signature: */s/ G. Eric Brunstad, Jr.*
/s/ G. Eric Brunstad, Jr. (Aug 18, 2020 11:34 EDT)

Email: eric.brunstad@dechert.com

Name of the person who is completing and signing this claim:

Name	G. Eric Brunstad, Jr.		
	First name	Middle name	Last name
Title	Partner		
Company	Dechert LLP		
	Identify the corporate servicer as the company if the authorized agent is a servicer.		
Address	1095 Avenue of the Americas		
	Number Street		
	New York	NY	10036
	City	State	ZIP Code
Contact phone	212-698-3500	Email	eric.brunstad@dechert.com

Attach Supporting Documentation (limited to a single PDF attachment that is less than 5 megabytes in size and under 100 pages):

☒ I have supporting documentation.
   (attach below)

☐ I do **not** have supporting documentation.

📎 Attachment

PLEASE REVIEW YOUR PROOF OF CLAIM AND SUPPORTING DOCUMENTS AND REDACT ACCORDINGLY PRIOR TO UPLOADING THEM. PROOFS OF CLAIM AND ATTACHMENTS ARE PUBLIC DOCUMENTS THAT WILL BE AVAILABLE FOR ANYONE TO VIEW ONLINE.

IMPORTANT NOTE REGARDING REDACTING YOUR PROOF OF CLAIM AND SUPPORTING DOCUMENTATION When you submit a proof of claim and any supporting documentation you must show only the last four digits of any social-security, individual's tax-identification, or financial-account number, only the initials of a minor's name, and only the year of any person's date of birth. If the claim is based on the delivery of health care goods or services, limit the disclosure of the goods or services so as to avoid embarrassment or the disclosure of confidential health care information.

A document has been redacted when the person filing it has masked, edited out, or otherwise deleted, certain information. The responsibility for redacting personal data identifiers (as defined in Federal Rule of Bankruptcy Procedure 9037) rests solely with the party submitting the documentation and their counsel. Prime Clerk and the Clerk of the Court will not review any document for redaction or compliance with this Rule and you hereby release and agree to hold harmless Prime Clerk and the Clerk of the Court from the disclosure of any personal data identifiers included in your submission. In the event Prime Clerk or the Clerk of the Court discover that personal identifier data or information concerning a minor individual has been included in a pleading, Prime Clerk and the Clerk of the Court are authorized, in their sole discretion, to redact all such information from the text of the filing and make an entry indicating the correction.

Official Form 410

Instructions for Proof of Claim

United States Bankruptcy Court   12/15

These instructions and definitions generally explain the law. In certain circumstances, such as bankruptcy cases that debtors do not file voluntarily, exceptions to these general rules may apply. You should consider obtaining the advice of an attorney, especially if you are unfamiliar with the bankruptcy process and privacy regulations.

A person who files a fraudulent claim could be fined up to $500,000, imprisoned for up to 5 years, or both.
18 U.S.C. §§ 152, 157 and 3571.

How to fill out this form

- **Fill in all of the information about the claim as of the date the case was filed.**

- **Fill in the caption at the top of the form.**

- **If the claim has been acquired from someone else, then state the identity of the last party** who owned the claim or was the holder of the claim and who transferred it to you before the initial claim was filed.

- **Attach any supporting documents to this form.**
  Attach redacted copies of any documents that show that the debt exists, a lien secures the debt, or both. (See the definition of *redaction* on the next page.)

  Also attach redacted copies of any documents that show perfection of any security interest or any assignments or transfers of the debt. In addition to the documents, a summary may be added. Federal Rule of Bankruptcy Procedure (called "Bankruptcy Rule") 3001(c) and (d).

- **Do not attach original documents because attachments may be destroyed after scanning.**

- **If the claim is based on delivering health care goods or services, do not disclose confidential health care information. Leave out or redact confidential information both in the claim and in the attached documents.**

- **A *Proof of Claim* form and any attached documents must show only the last 4 digits of any social security number, individual's tax identification number, or financial account number, and only the year of any person's date of birth.** See Bankruptcy Rule 9037.

- **For a minor child, fill in only the child's initials and the full name and address of the child's parent or guardian.** For example, write *A.B., a minor child* (*John Doe, parent, 123 Main St., City, State*). See Bankruptcy Rule 9037.

Confirmation that the claim has been filed

To receive confirmation that the claim has been filed, enclose a stamped self-addressed envelope and a copy of this form. You may view a list of filed claims in this case by visiting the Claims and Noticing Agent's website at https://cases.primeclerk.com/ftr.

Understand the terms used in this form

Administrative expense: Generally, an expense that arises after a bankruptcy case is filed in connection with operating, liquidating, or distributing the bankruptcy estate. 11 U.S.C. § 503.

Claim: A creditor's right to receive payment for a debt that the debtor owed on the date the debtor filed for bankruptcy. 11 U.S.C. §101 (5). A claim may be secured or unsecured.

Claim Pursuant to 11 U.S.C. §503(b)(9): A claim arising from the value of any goods received by the Debtor within 20 days before the date of commencement of the above case, in which the goods have been sold to the Debtor in the ordinary course of the Debtor's business. Attach documentation supporting such claim.

Creditor: A person, corporation, or other entity to whom a debtor owes a debt that was incurred on or before the date the debtor filed for bankruptcy. 11 U.S.C. §101 (10).

Debtor: A person, corporation, or other entity who is in bankruptcy. Use the debtor's name and case number as shown in the bankruptcy notice you received. 11 U.S.C. § 101 (13).

Evidence of perfection: Evidence of perfection of a security interest may include documents showing that a security interest has been filed or recorded, such as a mortgage, lien, certificate of title, or financing statement.

Information that is entitled to privacy: A *Proof of Claim* form and any attached documents must show only the last 4 digits of any social security number, an individual's tax identification number, or a financial account number, only the initials of a minor's name, and only the year of any person's date of birth. If a claim is based on delivering health care goods or services, limit the disclosure of the goods or services to avoid embarrassment or disclosure of confidential health care information. You may later be required to give more information if the trustee or someone else in interest objects to the claim.

Priority claim: A claim within a category of unsecured claims that is entitled to priority under 11 U.S.C. §507(a). These claims are paid from the available money or property in a bankruptcy case before other unsecured claims are paid. Common priority unsecured claims include alimony, child support, taxes, and certain unpaid wages.

Proof of claim: A form that shows the amount of debt the debtor owed to a creditor on the date of the bankruptcy filing. The form must be filed in the district where the case is pending.

Redaction of information: Masking, editing out, or deleting certain information to protect privacy. Filers must redact or leave out information entitled to **privacy** on the *Proof of Claim* form and any attached documents.

Secured claim under 11 U.S.C. §506(a): A claim backed by a lien on particular property of the debtor. A claim is secured to the extent that a creditor has the right to be paid from the property before other creditors are paid. The amount of a secured claim usually cannot be more than the value of the particular property on which the creditor has a lien. Any amount owed to a creditor that is more than the value of the property normally may be an unsecured claim. But exceptions exist; for example, see 11 U.S.C. § 1322(b) and the final sentence of 1325(a).

Examples of liens on property include a mortgage on real estate or a security interest in a car. A lien may be voluntarily granted by a debtor or may be obtained through a court proceeding. In some states, a court judgment may be a lien.

Setoff: Occurs when a creditor pays itself with money belonging to the debtor that it is holding, or by canceling a debt it owes to the debtor.

Unsecured claim: A claim that does not meet the requirements of a secured claim. A claim may be unsecured in part to the extent that the amount of the claim is more than the value of the property on which a creditor has a lien.

Offers to purchase a claim

Certain entities purchase claims for an amount that is less than the face value of the claims. These entities may contact creditors offering to purchase their claims. Some written communications from these entities may easily be confused with official court documentation or communications from the debtor. These entities do not represent the bankruptcy court, the bankruptcy trustee, or the debtor. A creditor has no obligation to sell its claim. However, if a creditor decides to sell its claim, any transfer of that claim is subject to Bankruptcy Rule 3001(e), any provisions of the Bankruptcy Code (11 U.S.C. § 101 et seq.) that apply, and any orders of the bankruptcy court that apply.

Please send completed Proof(s) of Claim to:

Frontier Communications Corp. Claims Processing Center
c/o Prime Clerk LLC
850 3rd Avenue, Suite 412
Brooklyn, NY 11232

Do not file these instructions with your form

**UNITED STATES BANKRUPTCY COURT
SOUTHERN DISTRICT OF NEW YORK**

In re:	
	Chapter 11
FRONTIER COMMUNICATIONS CORPORATION, *et al.*,[1]	**Case No. 20-22476 (RDD)**
Debtors.	**(Jointly Administered)**

**ADDENDUM TO PROOF OF CLAIM
BY INTELLECTUAL VENTURES II LLC
FOR FRONTIER'S PATENT INFRINGEMENT**

Intellectual Ventures II LLC ("IV") hereby files, as an unsecured priority claim, this claim against Frontier Communications Corporation ("Frontier"), and jointly and severally as to all affiliated, parent, and/or subsidiary debtors in the above-captioned proceeding, in the amount of $9,396,000 for Frontier's past infringement of patent assets held by IV.

IV'S ASSERTED PATENTS

1. IV owns all substantial right, title, and interest in the following U.S. patents (the "Asserted Patents"):

2. On November 11, 2003, United States Patent No. 6,647,068 ("the '068 Patent"), titled "Variable State Length Initialization," was duly and lawfully issued by the United States Patent and Trademark Office (the "PTO").

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[1] The last four digits of Debtor Frontier Communications Corporation's tax identification number are 9596. Due to the large number of debtor entities in these chapter 11 cases, for which joint administration has been granted, a complete list of the debtor entities and the last four digits of their federal tax identification numbers are not provided herein. A complete list of such information may be obtained on the website of the Debtors' proposed claims and noticing agent at https://cases.primeclerk.com/ftr. The location of the Debtors' service address for purposes of these chapter 11 cases is: 50 Main Street, Suite 1000, White Plains, New York 10606.

3.   On September 28, 2004, United States Patent No. 6,798,735 ("the '735 Patent"), titled "Adaptive Allocation for Variable Bandwidth Multicarrier Communication," was duly and lawfully issued by the PTO.

4.   On September 18, 2007, United States Patent No. 7,272,171 ("the '171 Patent"), titled "Variable State Length Initialization," was duly and lawfully issued by the PTO.

5.   On October 19, 2010, United States Patent No. 7,817,532 ("the '532 Patent"), titled "Adaptive Allocation for Variable Bandwidth Multicarrier Communication," was duly and lawfully issued by the PTO.

6.   On February 5, 2013, United States Patent No. 8,369,275 ("the '275 Patent"), titled "Adaptive Allocation for Variable Bandwidth Multicarrier Communication," was duly and lawfully issued by the PTO.

FRONTIER'S INFRINGEMENT

7.   Frontier and its affiliated, parent, and/or subsidiary debtors have infringed the Asserted Patents as follows:

8.   During the period before filing its petition in the instant bankruptcy proceeding and before certain of the Asserted Patents expired (and continuing thereafter as to those Asserted Patents that have not yet expired), Frontier infringed at least claims 7, 8, 16, and 17 of the '068 Patent; claims 1, 9, and 10 of the '735 Patent; claims 2 and 3 of the '171 Patent; claims 6, 7, 8, 9, and 12 of the '532 Patent; and claim 1 of the '275 Patent under 35 U.S.C. Section 271, by Frontier's use of at least the Adtran 1248, Adtran 1148, Adtran TA5000, Adtran TA3000, Alcatel 7300, Calix E5, Calix E7, Calix C7 digital subscriber line access multiplexers (DSLAMs), implementing VDSL2 and/or ADSL2/2+ technical standards promulgated by the International Telecommunication Union (ITU-T).

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9.   Exemplary claim charts are attached as Exhibits A-D outlining how Frontier

infringes the '068, '735, '171, and '532 Patents through Frontier's use of products implementing

particular ITU-T technical standards.

IV'S CLAIM FOR ROYALTY DAMAGES BASED ON FRONTIER'S INFRINGEMENT

10.   IV is party to a Patent License Agreement executed by one of Frontier's similarly-

situated competitors, in which Frontier's competitor agreed to license, *inter alia*, the Asserted

Patents (the "Competitor License").[2]

11.   IV and Frontier's competitor executed the Competitor License following IV's

assertion in a prior litigation of four of the five Asserted Patents against Frontier's competitor.

12.   The terms of the Competitor License are comparable to those that Frontier owes

to IV as compensation for its infringement of IV's patents.

13.   Based on the royalty terms of the Competitor License, the date of Frontier's

bankruptcy petition in this proceeding, and the date of this proof of claim, Frontier owes IV a

royalty of $2.71 per subscriber as compensation for Frontier's pre-petition infringement of the

Asserted Patents.

14.   Frontier's May 6, 2020 SEC 10-Q filings reports that as of March 31, 2020,

Frontier had 3.48 million DSL subscribers.

15.   For the period August 2014 (six years before filing of this proof of claim) through

April 2020 (when Frontier filed its petition in this bankruptcy proceeding), Frontier accordingly

owes to IV royalty damages of $9,396,000.

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[2] The Competitor License is not submitted herewith based on a contractual confidentiality
restriction. The Competitor License can be made available subject to an appropriate protective
order.

16.   IV reserves all rights to pursue, and intends to pursue, an administrative claim for

Frontier's post-petition infringement of the '068 and '171 Patents.

17.   This claim is without prejudice to any other claim that IV or its affiliates may

have against Frontier and/or any affiliated, parent, and/or subsidiary debtors.

 DATED: August 18, 2020   Respectfully submitted,

                                             /s/ G. Eric Brunstad, Jr.

                                             G. Eric Brunstad, Jr.
                                             New York State Bar No. 2119774
                                             eric.brunstad@dechert.com
                                             DECHERT LLP
                                             Three Bryan Park
                                             1095 Avenue of the Americas
                                             (212) 698-3500

                                             Counsel for Creditor
                                             Intellectual Ventures II LLC

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EXHIBIT A

**Exhibit A – Claim Chart for U.S. Patent No. 6,647,068
as applied to Frontier with respect to VDSL2**

'068 Patent, Claim 7	VDSL2[1]
7. In a multicarrier transceiver, a method for variable state length initialization comprising:	**"In a multicarrier transceiver"** Products compliant with ITU-T Recommendation G.993.2 comprise a transceiver – a device that both transmits and receives. "VTU," "VTU-O," and "VTU-R" are accepted abbreviations for the transceivers. ITU-T Recommendation G.993.2 (2006) § 4 (p. 10) ("VTU-O [is an abbreviation for] VTU at the Optical Network Unit (or central office, exchange, cabinet, etc., i.e., operator end of the loop)," and "VTU-R [is an abbreviation for] VTU at the Remote site (i.e., subscriber end of the loop)."). A transceiver transmits and receives a multicarrier signal. The transceiver produces this signal by modulating signal constellation points on multiple subcarrier frequencies and summing the result into a DMT symbol for simultaneous transmission. ITU-T Recommendation G.993.2 (2006) § 10.4.3 (p. 79). 10.4.3 Modulation by the inverse discrete Fourier transform (IDFT) The IDFT is used to modulate the output of the symbol encoder onto the DMT subcarriers. It converts the NSC complex values Z_i (as defined in clause 10.3.4) generated by the symbol encoder (frequency domain representation) into $2N$ real values x_n ($n = 0, 1, ..., 2N-1$), which is a time domain representation. The conversion shall be performed with a $2N$ point IDFT, with $N-1 \geq MSI$, as: $$x_n = \sum_{i=0}^{2N-1} \exp\left(j \cdot 2 \cdot \pi \cdot \frac{n \cdot i}{2 \cdot N}\right) \cdot Z_i \quad \text{for } n = 0 \text{ to } 2N-1$$ A multicarrier communication system includes a first transceiver, the VTU-O and a second transceiver, the VTU-R. **"a method for variable state length initialization"** A transceiver uses the initialization method specified in ITU-T Recommendation G.993.2, which is a variable state length initialization because, for some initialization states, the transceiver can change the length of the initialization state by performing the steps recited in the body of the claim. ITU-T Recommendation G.993.2 (2006) § 12.3 (pp. 123-190).

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[1] Although this document cites to only VDSL2 as described in G.993.2 (2006), VDSL2 is described in various documents published by the ITU, including but not limited to:

- Very High Speed Digital Subscriber Line Transceivers 2 (VDSL2), Telecommunication Standardization Sector of International Telecommunication Union (ITU-T), G.993.2 (02/2006) ("G.993.2 (2006)");
- Very High Speed Digital Subscriber Line Transceivers 2 (VDSL2), Amendment 1, Telecommunication Standardization Sector of International Telecommunication Union (ITU-T), G.993.2 – Amendment 1 (04/2007) ("G.993.2, Amendment 1");
- Very High Speed Digital Subscriber Line Transceivers 2 (VDSL2), Amendment 3: Support for emergency rate adjustment, specification of test parameter accuracy and other improvements, Telecommunication Standardization Sector of International Telecommunication Union (ITU-T), G.993.2 – Amendment 3 (08/2008) ("G.993.2, Amendment 3"); and
- Very High Speed Digital Subscriber Line Transceivers 2 (VDSL2), Telecommunication Standardization Sector of International Telecommunication Union (ITU-T), G.993.2, (12/2011) ("G.993.2 (2011)").

These contentions apply equally to units implementing other versions of the ITU Recommendations (including without limitation the references limited above) where those other versions have the same/similar language as relied upon in these contentions.

'068 Patent, Claim 7	VDSL2[1]
[a] receiving from a second multicarrier transceiver information identifying a value that determines a minimum number of multicarrier symbols in an initialization state;	During the initialization, the VTU-O receives the message R-PRM from the VTU-R. R-PRM identifies the value in Field #11 that determines the minimum duration of the initialization state R-P-TRAINING 1 expressed as a minimum number of multicarrier symbols, $T_{MIN-R-P-Train}$. ITU-T Recommendation G.993.2 (2006) § 12.3.3.2.2.3 (p. 150). Field #11 "Minimum duration of the R-P-TRAINING 1 signal ($T_{MIN-R-P-Train}$)" indicates the minimum duration of the R-P-TRAINING 1 signal that the VTU-R shall transmit. The value, $T_{MIN-R-P-Train}$, shall be expressed in DMT symbols. The duration shall be an integer multiple of 64 symbols. The integer multiple (i.e., the duration divided by 64) shall be encoded as an 8-bit value.
[b] receiving from the second multicarrier transceiver at least the minimum number of multicarrier symbols during the initialization state; and	The VTU-O receives at least $T_{MIN-R-P-Train}$ multicarrier symbols from the VTU-R while the VTU-R is in the R-P-TRAINING 1 initialization state. ITU-T Recommendation G.993.2 (2006) § 12.3.4.1 (p. 157). *See* Limitation [a]. channel discovery phase. After the VTU-O receives at least $T_{MIN-R-P-Train}$ R-P-TRAINING 1 symbols (Field #11 of R-PRM, see clause 12.3.3.2.2.3), it shall transmit O-P-SYNCHRO 4 to indicate the start of the TEQ and EC training stages. After detecting O-P-SYNCHRO 4, the VTU-R
[c] transmitting to the second multicarrier transceiver a predefined signal allowing exit of the initialization state and entry into a new initialization state, wherein the predefined signal is sent to the second multicarrier transceiver after at least the minimum number of multicarrier symbols have been received in the initialization state.	**"transmitting to the second multicarrier transceiver a predefined signal allowing exit of the initialization state and entry into a new initialization state"** The VTU-O transmits the predefined signal O-P-SYNCHRO 4 allowing exit of the R-P-TRAINING 1 initialization state and entry into the R-P-SYNCHRO 4 initialization state. ITU-T Recommendation G.993.2 (2006) § 12.3.4.1 (p. 157). channel discovery phase. After the VTU-O receives at least $T_{MIN-R-P-Train}$ R-P-TRAINING 1 symbols (Field #11 of R-PRM, see clause 12.3.3.2.2.3), it shall transmit O-P-SYNCHRO 4 to indicate the start of the TEQ and EC training stages. After detecting O-P-SYNCHRO 4, the VTU-R shall respond within a time period between 48 and 64 symbols by transmitting R-P-SYNCHRO 4. **"wherein the predefined signal is sent to the second multicarrier transceiver after at least the minimum number of multicarrier symbols have been received in the initialization state"** The VTU-O transmits O-P-SYNCHRO 4 after at least $T_{MIN-R-P-Train}$ multicarrier symbols have been received in the R-P-TRAINING 1 initialization state. ITU-T Recommendation G.993.2 (2006) § 12.3.4.1 (p. 157).

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'068 Patent, Claim 16	VDSL2
16. In a multicarrier transceiver, a method for variable state length initialization comprising:	**"In a multicarrier transceiver"** Products compliant with ITU-T Recommendation G.993.2 comprise a transceiver – a device that both transmits and receives. "VTU," "VTU-O," and "VTU-R" are accepted abbreviations for the transceivers. ITU-T Recommendation G.993.2 (2006) § 4 (p. 10) ("VTU-O [is an abbreviation for] VTU at the Optical Network Unit (or central office, exchange, cabinet, etc., i.e., operator end of the loop)," and "VTU-R [is an abbreviation for] VTU at the Remote site (i.e., subscriber end of the loop)."). A transceiver transmits and receives a multicarrier signal. The transceiver produces this signal by modulating signal constellation points on multiple subcarrier frequencies and summing the result into a DMT symbol for simultaneous transmission. ITU-T Recommendation G.993.2 (2006) § 10.4.3 (p. 79). **10.4.3 Modulation by the inverse discrete Fourier transform (IDFT)** The IDFT is used to modulate the output of the symbol encoder onto the DMT subcarriers. It converts the *NSC* complex values Z_i (as defined in clause 10.3.4) generated by the symbol encoder (frequency domain representation) into $2N$ real values x_n ($n = 0, 1, ..., 2N-1$), which is a time domain representation. The conversion shall be performed with a $2N$ point IDFT, with $N-1 \geq MSI$, as: $$x_n = \sum_{i=0}^{2N-1} \exp\left(j \cdot 2 \cdot \pi \cdot \frac{n \cdot i}{2 \cdot N} \right) \cdot Z_i \quad \text{for } n = 0 \text{ to } 2N-1$$ A multicarrier communication system includes a first transceiver, the VTU-O and a second transceiver, the VTU-R. **"a method for variable state length initialization"** A transceiver uses the initialization method specified in ITU-T Recommendation G.993.2, which is a variable state length initialization because, for some initialization states, the transceiver can change the length of the initialization state by performing the steps recited in the body of the claim. ITU-T Recommendation G.993.2 (2006) § 12.3 (pp. 123-190).
[a] receiving from a second multicarrier transceiver information identifying a value that determines a minimum number of multicarrier symbols in an initialization state;	During the initialization, the VTU-O receives the message R-PRM from the VTU-R. R-PRM identifies the value in Field #11 that determines the minimum duration of the initialization state R-P-TRAINING 1 expressed as a minimum number of multicarrier symbols, $T_{\text{MIN-R-P-Train}}$. This is also the minimum number of multicarrier symbols in the initialization state O-P-TRAINING 1 since the O-P-TRAINING 1 initialization state begins during the R-P-QUIET2 initialization state, continues through the transition to the R-P-TRAINING 1 initialization state and continues until at least $T_{\text{MIN-R-P-Train}}$ symbols of R-P-TRAINING 1 have been received. ITU-T Recommendation G.993.2 (2006) §§ 12.3.3.2.2.3 (p. 150) and 12.3.4.1 (p. 157), and Figure 12-6 (p. 156) and ITU-T Recommendation G.993.2 (2011) Figure 12-8 (p. 217). Field #11 "Minimum duration of the R-P-TRAINING 1 signal ($T_{\text{MIN-R-P-Train}}$)" indicates the minimum duration of the R-P-TRAINING 1 signal that the VTU-R shall transmit. The value, $T_{\text{MIN-R-P-Train}}$, shall be expressed in DMT symbols. The duration shall be an integer multiple of 64 symbols. The integer multiple (i.e., the duration divided by 64) shall be encoded as an 8-bit value.

'068 Patent, Claim 16	VDSL2
	channel discovery phase. After the VTU-O receives at least $T_{MIN-R-P-Train}$ R-P-TRAINING 1 symbols (Field #11 of R-PRM, see clause 12.3.3.2.2.3), it shall transmit O-P-SYNCHRO 4 to indicate the start of the TEQ and EC training stages. After detecting O-P-SYNCHRO 4, the VTU-R

Figure 12-6/G.993.2 – Timing diagram for the stages of the training phase |
| [b] transmitting to the second multicarrier transceiver at least the | The VTU-O transmits at least $T_{MIN-R-P-Train}$ multicarrier symbols to the VTU-R while the VTU-O is in the O-P-TRAINING 1 initialization state. ITU-T Recommendation G.993.2 (2006) § 12.3.4.1 (p. 157). *See* Limitation [a]. |

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'068 Patent, Claim 16	VDSL2
minimum number of multicarrier symbols during the initialization state; and	channel discovery phase. After the VTU-O receives at least $T_{MIN-R-P-Train}$ R-P-TRAINING 1 symbols (Field #11 of R-PRM, see clause 12.3.3.2.2.3), it shall transmit O-P-SYNCHRO 4 to indicate the start of the TEQ and EC training stages. After detecting O-P-SYNCHRO 4, the VTU-R
[c] transmitting to the second multicarrier transceiver a predefined signal indicating exit from the initialization state and entry into a new initialization state, wherein the predefined signal is sent to the second multicarrier transceiver after at least the minimum number of multicarrier symbols have been received in the initialization state.	**"transmitting to the second multicarrier transceiver a predefined signal indicating exit from the initialization state and entry into a new initialization state"** The VTU-O transmits the predefined signal O-P-SYNCHRO 4 indicating exit from the O-P-TRAINING 1 initialization state and entry into the O-P-PILOT 2 initialization state. ITU-T Recommendation G.993.2 (2006) § 12.3.4.1 (p. 157) and § 12.3.4.1 (p. 157), and Figure 12-6 (p. 156) and ITU-T Recommendation G.993.2 (2011) Figure 12-8 (p. 217). channel discovery phase. After the VTU-O receives at least $T_{MIN-R-P-Train}$ R-P-TRAINING 1 symbols (Field #11 of R-PRM, see clause 12.3.3.2.2.3), it shall transmit O-P-SYNCHRO 4 to indicate the start of the TEQ and EC training stages. After detecting O-P-SYNCHRO 4, the VTU-R Immediately after transmission of O-P-SYNCHRO 4, the VTU-O shall transmit O-P-PILOT 2, and shall continue transmitting O-P-PILOT 2 for T_{VTU-O_TEQ} symbols. Immediately after transmission of
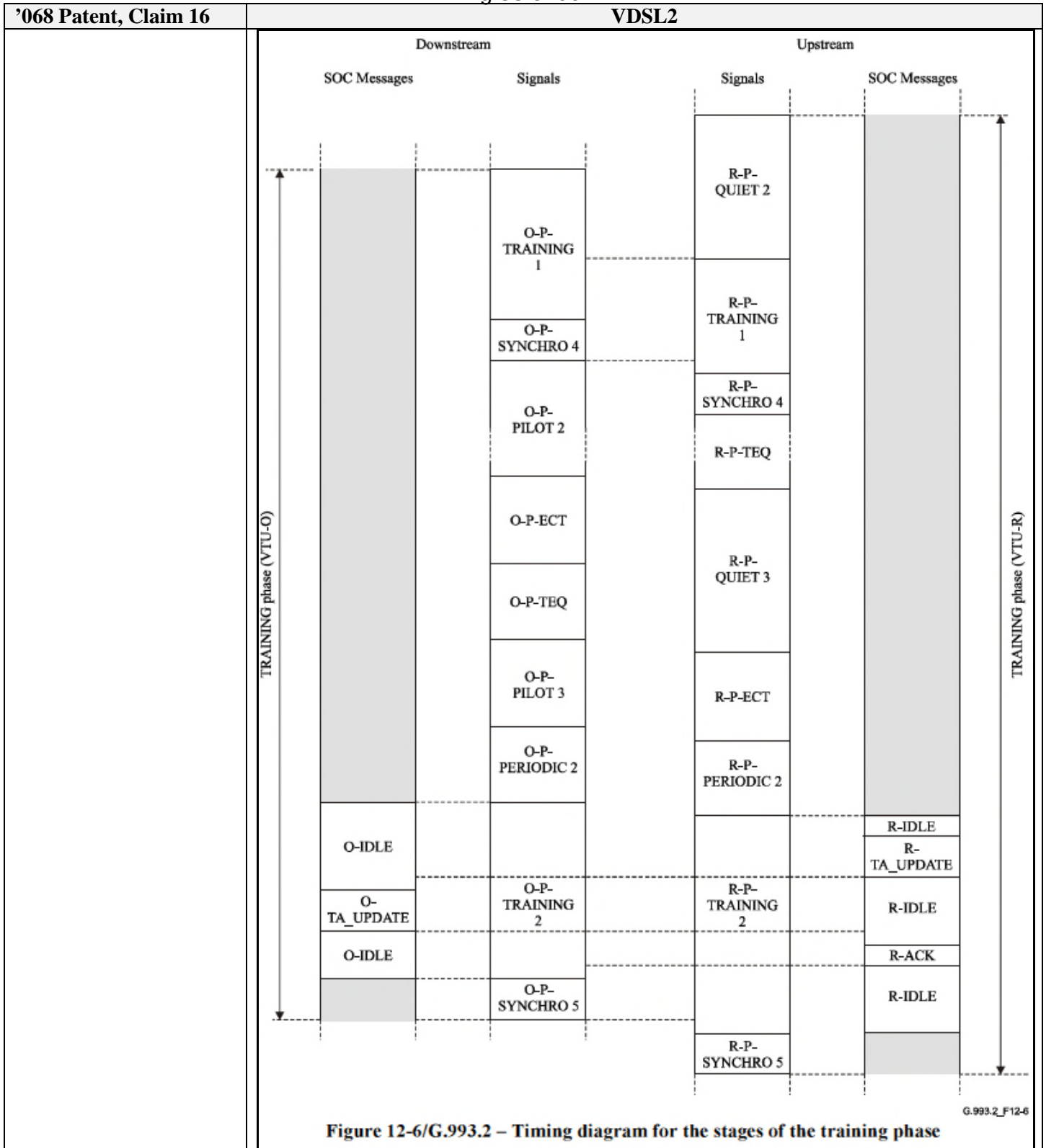
'068 Patent, Claim 16	VDSL2
	Figure 12-6/G.993.2 – Timing diagram for the stages of the training phase **"wherein the predefined signal is sent to the second multicarrier transceiver after at least the minimum number of multicarrier symbols have been received in the initialization state"** The VTU-O sends O-P-SYNCHRO 4 after at least $T_{MIN-R-P-Train}$ multicarrier symbols have been received in the O-P-TRAINING 1 initialization state. ITU-T Recommendation G.993.2 (2006) § 12.3.4.1 (p. 157).

EXHIBIT B

Exhibit B – Claim Chart for U.S. Patent No. 6,798,735
as applied to Frontier with respect to ADSL2/+

`735 Patent, Claim 1	ADSL2/+[1]
1. In a multicarrier transmission system including two communication units, a method for modulat[ing][2] bits onto subchannels of a communication channel between the two communication units, the method comprising:	This claim is infringed by an ADSL2-compliant ATU-C (in the upstream[3] direction) performing any On-line Reconfiguration operations (*i.e.*, Bit Swapping, Dynamic Rate Repartitioning and/or Seamless Rate Adaptation). *See* ITU-T Recommendation G.992.3, January 2005 ("G.992.3 (2005)"), § 10.2 *et seq.* (describing On-line Reconfiguration operations). An ADSL2 communication system is a multicarrier transmission system with two communication units: an ADSL transceiver located at the service provider's location (called an "ATU-C") and an ADSL transceiver located at the subscriber's location (called an "ATU-R"). Both the ATU-C and the ATU-R[4] are transceivers, *i.e.*, devices that both transmit and receive. *See* G.992.3 (2005), § 4 ("Abbreviations," p. 6) (defining "ATU" as an "ADSL Transceiver Unit;" defining "ATU-C" as "ATU at the central office end (i.e. network operator);" defining "ATU-R" as "ATU at the remote terminal end (i.e., CP)"). ADSL2 transceivers (ATU-Cs) are multicarrier in nature (*i.e.,* the transceivers communicate with each other using a plurality of discrete frequency subchannels[5]), as they transmit and receive Discrete Multi-tone ("DMT," *see* G.992.3 (2005), § 4) signals carrying bits modulated across a plurality of subcarriers. *See id.* at § 8.2 (describing PMD Function[6] of transceivers as performing Modulation). *See also id.* at § 3.15 (defining "DMT symbol" as "[a] set of complex values $\{Z_i\}$ forming the frequency domain inputs to the inverse discrete Fourier transform (IDFT) (see 8.8.2); The DMT symbol is equivalently the set of real valued time samples, $\{x_n\}$, related to the set of $\{Z_i\}$ via the IDFT."); *id.* at § 3.37 (defining "subcarrier" as "[a] particular complex valued input, Z_i, to the IDFT (see 8.8.2)."); *id.* at § 8.8 ("Modulation") ("The modulator shall modulate a constellation encoder output data frame or sync frame (containing $NSC - 1$ complex values Z_i, $i = 1$ to $NSC - 1$) into a DMT symbol."). An ADSL2 transceiver (ATU-C) communicates with another transceiver in a multicarrier modulation system by transmitting and/or receiving a multicarrier signal to and/or from another transceiver. *See*, *e.g.*, G.992.3 (2005) §§ 8.8 (p. 89) and 8.8.1 (p. 89). *See also id.* at § 8.6.

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[1]   Relevant features of the ADSL2 standard are described in documents including but not limited to G.992.3 (2005) and G.992.3 (2009). These infringement contentions cite exclusively to the ADSL2 standard; however, they also apply to the ADSL2+ (G.992.5) standard. ADSL2+ is a superset of ADSL2, and the features pertinent to infringement are common to both. *See* G.992.5 ("This Recommendation is written as a delta Recommendation relative to Recommendation ITU-T Rec. G.992.3. For the clauses which have been changed, this Recommendation contains complete replacement text (unless explicitly indicated). For the clauses which have not been changed, this Recommendation contains only the clause heading, with reference to Recommendation ITU-T G.992.3.").

[2]   Corrected suspected typo.
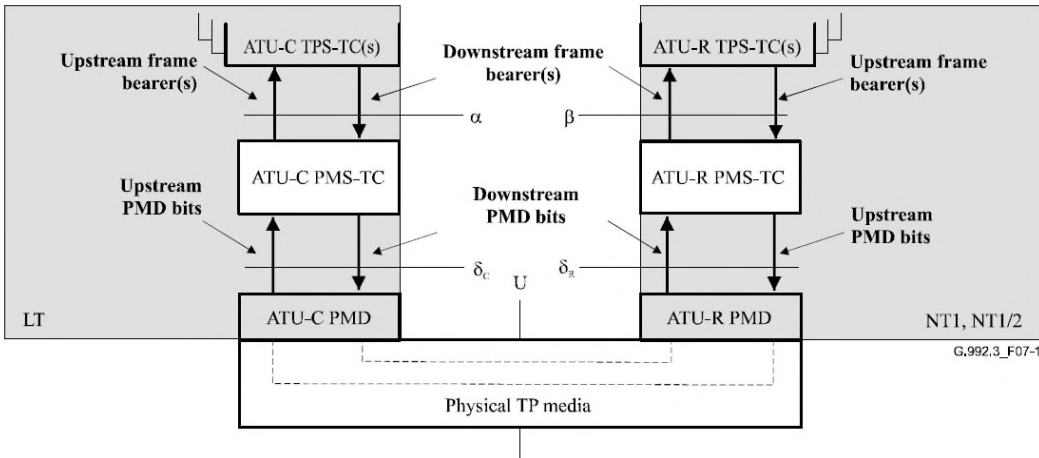
[3]   In the upstream (or uplink) direction, the ATU-C receives signals transmitted by the ATU-R. *See* G.992.3 (2005), § 3.44 (p. 6).

[4]   In the downstream (or downlink) direction, the ATU-R receives signals transmitted by the ATU-C. *See* G.992.3 (2005), § 3.16 (p. 4).

[5]   In the context of this chart, the terms "subchannel(s)," "subcarrier(s)," "each subcarrier," and "all subcarriers" refer to the set of subcarriers with subcarrier index $i = 1$ to $NSC - 1$, where NSC is equal to NSC_{us} for upstream transmission and NSC_{ds} for downstream transmission. *See* G.992.3 (2005), § 8.5 (Table 8-4, describing "NSC").

[6]   "PMD" refers to "Physical Media Dependent (sublayer)." *See* G.992.3 (2005) (§ 4).

**Exhibit B – Claim Chart for U.S. Patent No. 6,798,735
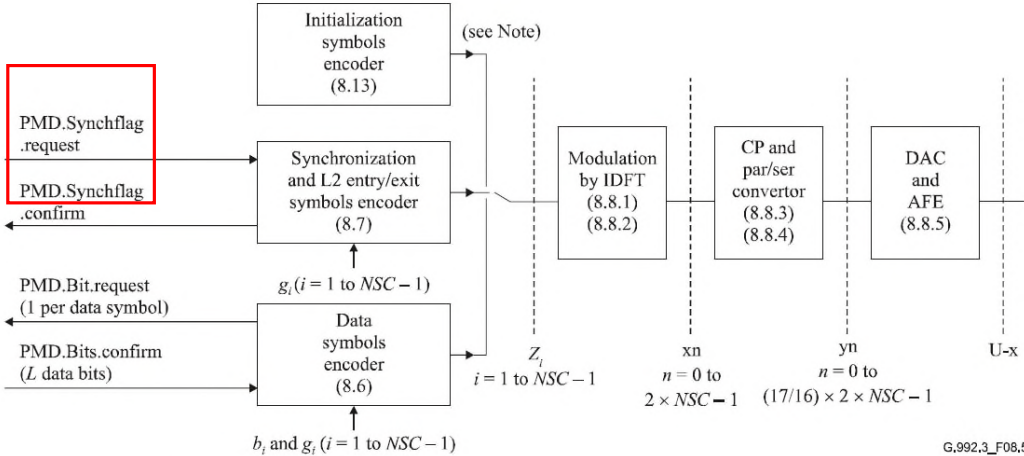as applied to Frontier with respect to ADSL2/+**

`735 Patent, Claim 1	ADSL2/+[1]
	In the ADSL2 multicarrier communication system, a communication link is established between an ATU-C and an ATU-R via a physical media such as a metallic twisted pair (*e.g.*, copper telephone wires). *See* G.992.3 (2005), Summary (p. i). *See id.* at § 7.1 and Figure 7-1 (p. 22). **Figure 7-1/G.992.3 – PMS-TC transport capabilities within the user plane**
[a] allocating bits to subchannels of the communication channel according to a first bit allocation table;	An ADSL2 transceiver (ATU-C (in the upstream direction)) allocates bits to subchannels of the communication channel according to a first bit allocation table before performing On-line Reconfiguration operations (*i.e.*, Bit Swapping, Dynamic Rate Repartitioning, and/or Seamless Rate Adaptation). An ADSL2-compliant transceiver (ATU-C in the upstream direction) allocates bits to subchannels of the communication channel according to a first bit allocation table to communicate with a transceiver on the other side of the ADSL2 link. A first bit allocation table is used by the receive function of the transceiver to receive data transmissions over the link prior to the performance of an On-line Reconfiguration. The first bit allocation table is often determined during an initialization procedure with tone ordering. *See* G.992.3 (2005), § 8.6.1 (p. 74) ("During initialization, the receive PMD function shall calculate the numbers of bits and the relative gains to be used for every subcarrier . . . . The calculated bits and gains and the tone ordering shall be sent back to the transmit PMD function during a later stage of initialization . . . . The pairs of bits and relative gains are defined . . . as a bit allocation table b and gain table g . . . ."). The first bit allocation table is also sometimes determined during one or more previous On-line Reconfigurations of the channel parameters during the data communication between an ATU-C and an ATU-R, and the first bit allocation table is specified at least in part in the control parameters associated with a previous reconfiguration. *See* G.992.3 (2005), § 8.5.1 (p. 64, Table 8-4) (defining control parameters, including b_i, which comprise a bit allocation table). *See also id.* at §§ 8.16.1 & 8.17.1 (describing b_i as a control parameter associated with both On-line Reconfiguration and Power Management operations).
[b] monitoring the communication channel during transmission of the bits allocated to the	An ADSL2 transceiver (an ATU-C in the upstream direction) monitors the communication channel during transmission of the bits allocated to the subchannels according to the first bit allocation table, which enables the transceiver to perform On-line Reconfiguration operations (i.e., Bit Swapping, Dynamic Rate Repartitioning, and/or Seamless Rate Adaptation).

**Exhibit B – Claim Chart for U.S. Patent No. 6,798,735
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`735 Patent, Claim 1	ADSL2/+[1]
subchannels according to the first bit allocation table;	Monitoring of the communication channel by an ADSL2 transceiver (ATU-C) can be performed, for example, by monitoring the conditions of signals (*e.g.,* line and noise conditions) received over the communication channel using management plane procedures. *See* G.992.3 (2005), § 8.12 *et seq.* (pp. 95–104); *see also id.* at § 8.12.3 (p. 97) (describing test parameters that can be used to monitor channel conditions of the communication channel, such as test parameter Channel Characteristics Function H(f) per subcarrier (CCF-ps), which can be used to monitor "the physical copper loop condition," and test parameter "Signal-to-Noise Ratio SNR(f) per subcarrier (SNR-ps)," which can be used to monitor "time-dependent changes in crosstalk levels and line attenuation"); *see also id.* at § 8.12.3.3 (pp. 100-01) (describing that the SNR-ps parameters of the communication channels are measured and updated autonomously by the ATU); *see also id.* at § 8.12.3.6 (p. 102) (describing that the signal-to-noise ratio margin parameters (SNRM) of the communication channels are measured and updated autonomously by the ATU unit); *See also id.* at § 9.4.1.10 (pp. 191–93) (describing the use of test parameter messages used by the ATU units for monitoring the communication channel). *See also* G.997.1 (2006), §§ 7.3.1.4, *et seq.,* 7.5.1.13, 7.5.1.14. Monitoring of the communication channel by an ADSL2 transceiver (ATU-C) can also be performed by monitoring control messages received from another ATU transceiver. For example, in a transmitter-initiated On-line Reconfiguration operation, the receiving ATU monitors control messages transmitted by the initiating ATU. *See* G.992.3 (2005), §§ 9 & 10.2.2.2 (p. 202).
[c] developing a second bit allocation table at one of the communication units in response to monitoring the communication channel;	An ADSL2 transceiver (an ATU-C in the upstream direction) develops a second bit allocation table in response to monitoring the communication channel when performing any On-line Reconfiguration operation (*i.e.*, Bit Swapping, Dynamic Rate Repartitioning, and/or Seamless Rate Adaptation). A second bit allocation table is used by the transceiver pair to communicate data after the performance of an OLR and/or Low Power Entry operation. During an OLR operation performed by an ADSL2 transceiver, the ADSL2 transceiver (ATU-C in the upstream direction) monitors the communication channel (*e.g.,* by monitoring the receive signal condition or control messages from another transceiver). *See* 1[b], above. In response to the monitoring, an ATU-C develops a second bit allocation table to be used by the ATUs after performing the OLR. *See* G.992.3 (2005) at §§ 8.12 & 10.2.2.1. *See also* G.997.1 (2006), §§ 7.3.1.4, *et seq.,* 7.5.1.13, 7.5.1.14.
[d] transmitting the second bit allocation table to the other of the communication units over the communication channel; and	An ADSL2 transceiver (an ATU-C in the upstream direction and/or an ATU-R in the downstream direction) transmits the second bit allocation table to the other of the communication units over the communication channel when performing any On-line Reconfiguration operation (*i.e.*, Bit Swapping, Dynamic Rate Repartitioning, and/or Seamless Rate Adaptation) and/or Low Power Entry operation. An ADSL2 transceiver (an ATU-C in the upstream direction) transmits the second bit allocation table to the other transceiver for communication with the other transceiver over an ADSL2 communication link during an OLR operation (*i.e.*, Bit Swapping, Dynamic Rate Repartitioning and/or Seamless Rate Adaptation). *See* G.992.3 (2005), § 8.16 (p. 166).

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`735 Patent, Claim 1	ADSL2/+[1]
	An ADSL2 transceiver (ATU-C) transmits a second bit allocation table to the other transceiver when it performs one of the three types of OLR operations: bitswap, dynamic rate repartitioning, and/or seamless rate adaptation. During an OLR procedure, the ADSL2 transceiver (ATU-C) changes one or more parameters b_i, which specify the number of bits to be allocated to each subchannel of the multicarrier system (*i.e.,* the parameters b_i constitute a second bit allocation table.). *See* G.992.3 (2005), § 10.2.1 (p. 200). To transmit the second bit allocation table to the other transceiver, the receiver portion of an ADSL2 transceiver (ATU-C) sends a control message specifying the number of bits allocated to each subchannel to the transmitter portion the ADSL2 transceiver (ATU-C) on the other side of the ADSL2 link in the multicarrier system. *See* G.992.3 (2005), § 8.16.1 (p. 167) (describing "[r]econfigurable control parameters of the PMD function" as including "number of bits per subcarrier"); *id.* at § 9.4.1.1 (Table 9-7) (all OLR message Types require the receiver to send octets "describing subcarrier parameter field for each subcarrier"[7]). *See also id.* at § 9.4.1 (p. 174, Table 9-2) (describing that the on-line reconfiguration command includes "[n]ew configuration including all necessary PMS-TC and PMD control values."); *id.* at § 10.2.2.1 (pp. 222-23) (describing that in an on-line reconfiguration procedure, the receiving "ATU's control function sends the necessary control messages describing the new values of the transmit PMD function control parameters to the transmitting ATU's control function," where the "new values of the transmit PMD function control parameters" include the second bit allocation table developed by the receiving ATU as described in G.992.3 (2005), § 8.5.1 (p. 64, Table 8-4)); *id.* at § 8.5.1 (p. 64, Table 8-4) (describing that the PMD control parameters include parameters b_i, which specify the entries in the second bit allocation table). This limitation may also be met under the doctrine of equivalents.
[e] storing the first and second bit allocation tables at each of the communication units.	An ADSL2 transceiver (an ATU-C in the upstream direction) stores the first and second bit allocation tables when performing any On-line Reconfiguration operation (*i.e.*, Bit Swapping, Dynamic Rate Repartitioning, and/or Seamless Rate Adaptation). An ADSL2 transceiver (ATU-C) on each side of the ADSL2 communication link necessarily stores the first and second bit allocation tables when the receiving ATU develops the second bit allocation table or the transmitting ATU receives the second bit allocation table from another ATU, while the transmitting and/or receiving ATU continues transmitting and/or receiving data on the communication channel using the first bit allocation table. *See* G.992.3 (2005) at §§ 10.2.2 & 10.3.2. Before performing an OLR (*i.e.*, Bit Swapping, Dynamic Rate Repartitioning, and/or Seamless Rate Adaptation), an ADSL2 transceiver (ATU-C) communicates data with another transceiver on the ADSL2 link using a first bit allocation table stored in the memory of the respective ATU. *See* [a] above. When performing an OLR (*i.e.*, Bit Swapping, Dynamic Rate Repartitioning, and/or Seamless Rate Adaptation), a receiving ATU develops and stores a second bit allocation table and then transmits the second bit allocation table to the transmitting ATU, and the transmitting ATU stores the second bit allocation table for use upon reception. *See* [c] and [d] above. During the period of time between developing/transmitting a second bit allocation table until the ATUs utilize the second bit

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7   A subcarrier parameter field contains bits specifying, *inter alia*, bits allocated per subchannel. *See* G.992.3 (2005) at § 9.4.1.1.

Exhibit B – Claim Chart for U.S. Patent No. 6,798,735
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`735 Patent, Claim 1	ADSL2/+[1]
	allocation table for modulation and transmission of bits, the ATUs necessarily are each storing a first and second bit allocation table. *See* G.992.3 (2005) at §§ 10.2.2 & 10.3.2.

**Exhibit B – Claim Chart for U.S. Patent No. 6,798,735
as applied to Frontier with respect to ADSL2/+**

`735 Patent, Claim 9	ADSL2/+
9. The method of claim 1 further comprising receiving a flag over the communication channel to synchronize switching from the first bit allocation table to the second bit allocation table for allocating bits to subchannels.	*See* claim 1 above. This claim is infringed by an ADSL2-compliant ATU-C (in the upstream direction) performing any On-line Reconfiguration operations (*i.e.*, Bit Swapping, Dynamic Rate Repartitioning and/or Seamless Rate Adaptation). An ADSL2 transceiver (an ATU-C in the upstream direction) receives a flag over the communication channel to synchronize switching from the first bit allocation table to the second bit allocation table for allocating bits to subchannels when performing any On-line Reconfiguration operation (*i.e.*, Bit Swapping, Dynamic Rate Repartitioning, and/or Seamless Rate Adaptation). An ADSL2 transceiver (an ATU-C in the upstream direction) receives a PMD.Synchflag primitive from another transceiver on the other side of the ADSL2 link during an OLR procedure (*i.e.*, Bit Swapping, Dynamic Rate Repartitioning, and/or Seamless Rate Adaptation). The ADSL2 transceiver (ATU-C) first sends an OLR command to another transceiver, and then receives a PMD.Syncflag primitive from the other transceiver in response, where the PMD.Syncflag primitive is used as a time marker to synchronize the switching from the first bit allocation table to the second bit allocation table. *See* G.992.3 (2005), § 9.4.1 (p. 174, Table 9-2) (describing response to an OLR command as including a "PMD.Synchflag primitive"). *See also id.* at § 10.2.2.1 (p. 202) (describing during an On-line Reconfiguration procedure, an ATU-C receives a PMD.Synchflag from the other transceiver's transmit PMD function.); *id.* at § 8.3 (p. 60, Table 8-1) (describing that the PMD.Synchflag is used by ADSL2 transceiver (ATU-C) to coordinate the On-line Reconfiguration procedure, including synchronizing the switching from first bit allocation table to the second bit allocation table). *See also* G.992.3 (2005), § 8.4 and Figure 8-5 (p. 202). NOTE – The Initialization Symbols Encoder defines Z_i values for $i = 1$ to $2 \times NSC - 1$ (see 8.13.2.4). **Figure 8-5/G.992.3 – Block diagram of the transmit PMD function**

**Exhibit B – Claim Chart for U.S. Patent No. 6,798,735
as applied to Frontier with respect to ADSL2/+**

`735 Patent, Claim 10	ADSL2/+
10. The method of claim 9 further comprising commencing use of the second bit allocation table for allocating bits to subchannels at a designated frame subsequent to receipt of the flag.	*See* claim 9 above. This claim is infringed by an ADSL2-compliant ATU-C (in the upstream direction) performing any On-line Reconfiguration operations (*i.e.*, Bit Swapping, Dynamic Rate Repartitioning and/or Seamless Rate Adaptation). An ADSL2 transceiver (an ATU-C in the upstream direction) commences use of a second bit allocation table for allocating bits to subchannels at a designated frame subsequent to receipt of the flag when performing any On-line Reconfiguration operation (*i.e.*, Bit Swapping, Dynamic Rate Repartitioning, and/or Seamless Rate Adaptation). An ADSL2 transceiver (an ATU-C in the upstream direction) performing an OLR (*i.e.*, Bit Swapping, Dynamic Rate Repartitioning, and/or Seamless Rate Adaptation) commences use of a second bit allocation table for allocating bits to subchannels to communicate with the other transceiver (ATU-R) after four frames (*i.e.*, starting with the fifth frame) following the receipt of the PMD.Synchflag. *See* G.992.3 (2005), § 8.16.2 (p.167). *See also id.* at § 8.4 & Fig. 8-6.

EXHIBIT C

**Exhibit C – Claim Chart for U.S. Patent No. 7,817,532
as applied to Frontier with respect to VDSL2**

`532 Patent, Claim 6	VDSL2[1]
6. A method, comprising: [a] utilizing, by a transceiver, a first allocation of bits to subchannels of a multicarrier modulation system to communicate with another transceiver;	Accused instrumentalities compliant with the ITU-T Recommendation G.993.2 standard ("VDSL2-compliant") comprise a transceiver, *i.e.*, a device that both transmits and receives, that establishes a communication link with another VDSL2 transceiver via a metallic twisted pair. A VDSL2 transceiver is commonly referred to as a VTU. *See* ITU-T Recommendation G.993.2, December 2011 ("G.993.2 (2011)"), Summary (p. i); *id.* at § 4 ("Abbreviations") p. 11 (defining "VTU" as a "VDSL2 Transceiver Unit"). The VDSL transceiver located at the service provider's location is commonly called the "VTU-O" and the VDSL transceiver located at the subscriber's location is commonly called the "VTU-R." *See* G.993.2 (2011), § 4 ("Abbreviations"), p. 11 (defining "VTU" as "VDSL2 Transceiver Unit;" defining "VTU-O" as "VTU at the Optical Network Unit (or central office, exchange, cabinet, etc., i.e., operator end of the loop);" defining "VTU-R" as "VTU at the Remote site (i.e., subscriber end of the loop)"). This claim is infringed by a VTU-O (in the downstream direction) and/or VTU-R (in the upstream direction) performing any On-line Reconfiguration (OLR) operation (*i.e.*, Bit Swapping, Seamless Rate Adaptation ("SRA"), and/or Save Our Showtime ("SOS")). *See* G.993.2 (2011), § 13.1 *et seq.* (describing On-line Reconfiguration operations). A VDSL transceiver (a VTU-O in the downstream direction and/or a VTU-R in the upstream direction) utilizes a first allocation of bits to subchannels of a multicarrier modulation system to communicate with another transceiver when performing On-line Reconfiguration (OLR) operation (*i.e.*, Bit Swapping, SRA and/or SOS). A first allocation of bits is utilized by a VTU-O and/or VTU-R to transmit bits prior to the performance of an OLR operation. VDSL2 transceivers (VTU-O and/or VTU-R) are multicarrier in nature (*i.e.,* the transceivers communicate with each other using a plurality of discrete frequency subchannels), as they transmit and receive Discrete Multi-tone ("DMT," *see* G.993.2 (2011) at § 4) signals carrying bits modulated across a plurality of subcarriers. *See id.* at § 10.1 (describing PMD sublayer of VDSL2 transceivers, and noting: "The functional model of the PMD sublayer is presented in Figure 10-1. In the transmit direction, the PMD sublayer receives input data frames from the PMS-TC sublayer via the δ interface as specified in clause 9.1. Each data frame contains an integer number of data bits equal to L0 + L1 to be modulated onto one DMT symbol."); *id.* at

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[1]   Although this document cites to only VDSL2 as described in G.993.2 (2011), VDSL2 is described in various documents published by the ITU, including but not limited to:

- Very High Speed Digital Subscriber Line Transceivers 2 (VDSL2), Telecommunication Standardization Sector of International Telecommunication Union (ITU-T), G.993.2 (02/2006) ("G.993.2 (2006)");

- Very High Speed Digital Subscriber Line Transceivers 2 (VDSL2), Amendment 1, Telecommunication Standardization Sector of International Telecommunication Union (ITU-T), G.993.2 – Amendment 1 (04/2007) ("G.993.2, Amendment 1");

- Very High Speed Digital Subscriber Line Transceivers 2 (VDSL2), Amendment 3: Support for emergency rate adjustment, specification of test parameter accuracy and other improvements, Telecommunication Standardization Sector of International Telecommunication Union (ITU-T), G.993.2 – Amendment 3 (08/2008) ("G.993.2, Amendment 3"); and

- Very High Speed Digital Subscriber Line Transceivers 2 (VDSL2), Telecommunication Standardization Sector of International Telecommunication Union (ITU-T), G.993.2, (12/2011) ("G.993.2 (2011)").

**Exhibit C – Claim Chart for U.S. Patent No. 7,817,532
as applied to Frontier with respect to VDSL2**

`532 Patent, Claim 6	VDSL2[1]
	§ 10.4.1 (under Modulation heading, describing "Data subcarriers"). *See also id.* at § 3.17 (defining "DMT symbol" as "The time-domain samples emerging from the DMT modulator during one symbol period, following insertion of the cyclic extension and completion of the windowing and overlap-and-add operations (see clause 10.4.4). During showtime, there are two types of DMT symbols: data symbols and sync symbols."); *id.* at § 3.56 (defining "subcarrier" as "A fundamental element of a discrete multi-tone (DMT) modulator. The modulator partitions the channel bandwidth into a set of parallel subchannels. The centre frequency of each subchannel is a subcarrier, onto which bits may be modulated for transmission over a channel (see clause 10)."). A VDSL2 transceiver (VTU-O and/or VTU-R) communicates with another VDSL2 transceiver in a multicarrier modulation system by transmitting and/or receiving a multicarrier signal to and/or from another transceiver. *See, e.g.,* G.993.2 (2011), §§ 10.4.1 – 10.4.3 (pp. 93-94) (describing that the data subcarriers are "indexed from $i=0$ to $i=MSI$," and "[t]he IDFT is used to modulate the output of the symbol encoder to the DMT subcarriers."). *See also id.* at §§ 10.3 *et seq.* and 10.4 *et seq.* A VDSL2 transceiver (VTU-O and/or VTU-R) communicates with another VDSL2 transceiver (VTU-R and/or VTU-O) through a physical media such as a metallic twisted pair. *See, e.g.,* G.993.2 (2011), §§ 5.2-5.4 (pp. 13-19) and Figure 5-2 (p. 13). **Figure 5-2 – User plane protocol reference model** A VDSL transceiver (a VTU-O in the downstream direction and/or a VTU-R in the upstream direction) utilizes a first allocation of bits to subchannels of a multicarrier modulation system to communicate with another transceiver when performing On-line Reconfiguration (OLR) operation (*i.e.*, Bit Swapping, SRA and/or SOS). A first allocation of bits is utilized by a VTU-O and/or VTU-R to transmit bits prior to the performance of an OLR operation. The first allocation of bits to subchannels is often determined during an initialization procedure. *See* G.993.2 (2011), § 10.3.1 (p. 78) ("During initialization, the receive PMD function shall calculate the numbers of bits and the relative gains to be used for every subcarrier. . . . The calculated bits and gains and the tone ordering shall be sent back to the transmit PMD function during the channel analysis and exchange phase of initialization. . . . The pairs of bits and relative gains are defined . . . as a bit allocation table b and gain table g. (*i.e., b_i* and g_i, for all subcarrier indices i that belong to the MEDLEY set)."). The first allocation of bits is also sometimes determined by a previous reconfiguration of the subchannel parameters during data communication between a VTU-O and a VTU-R, wherein

Exhibit C – Claim Chart for U.S. Patent No. 7,817,532
as applied to Frontier with respect to VDSL2

`532 Patent, Claim 6	VDSL2[1]
	the first allocation of bits to subchannels is specified at least in part by the control parameters associated with a previous reconfiguration. *See* G.993.2 (2011), § 13.2.1 (p. 276, Table 13-1) (describing reconfigurable control parameters of the PMD function, including b_i).
[b] selecting, by the transceiver, a different allocation of bits to subchannels of the multicarrier modulation system;	A VTU-O (in the downstream direction) and/or a VTU-R (in the upstream direction) select a different allocation of bits to subchannels of the multicarrier modulation system when performing any On-line Reconfiguration (OLR) operation (*i.e.*, Bit Swapping, SRA, and/or SOS). A different allocation of bits is an allocation of bits to subcarriers that differs in some way from the previous allocation of bits and is selected as part of the performance of an OLR operation. A VDSL2 transceiver (VTU-O in the downstream direction and/or a VTU-R in the upstream direction) selects a second/different allocation of bits to subchannels for communication with a transceiver on the other side of a VDSL2 link during an OLR procedure (*i.e.*, Bit Swapping, SRA, and/or SOS). *See* G.993.2 (2011), § 13.1 *et seq.* The VTU-R and VTU-O are programmed to perform a variety of OLR operations (including Bit Swapping, SRA, and/or SOS) that change transmission parameters. *See id.* at § 13.1 *et seq.* These operations transmission parameters including, *inter alia*, the number of bits per subcarrier (b_i) and the fine gain for each subcarrier (g_i). *See id.* During an OLR procedure (*i.e.*, Bit Swapping, SRA, and/or SOS), a VTU-O (in the downstream direction) and/or a VTU-R (in the downstream direction) determines and selects a different allocation of bits to subchannels by selecting new b_i parameters, which specify the number of bits to be allocated to each subchannel of the multicarrier system. *See* G.993.2 (2011), at § 13.2.1 (p. 276, Table 13-1) (describing reconfigurable control parameters of the PMD function, including b_i). During an OLR procedure, a VTU-O in the downstream direction and/or a VTU-R in the upstream direction receive an OLR command requesting and specifying a change in parameters from the other transceiver, including, *inter alia*, a different allocation of bits to subchannels. *See id.* at § 11.2.3.3. When the VTU-O in the downstream direction and/or the VTU-R in the upstream direction determines that it can comply with the requested change in parameters, it selects the requested different allocation of bits to subchannels, which selection is confirmed to the other transceiver with a Syncflag. *See id.* at § 11.2.3.2 (Table 11-2)
[c] transmitting, by the transceiver, a flag to the other transceiver; and	A VTU-O (in the downstream direction) and/or a VTU-R (in the upstream direction) transmit a flag to the other transceiver when performing any On-line Reconfiguration (OLR) operation (*i.e.*, Bit Swapping, SRA, and/or SOS). A VDSL2 transceiver (a VTU-O in the downstream direction and/or a VTU-R in the upstream direction) transmits a Syncflag to the other transceiver on the other side of the VDSL2 link during an On-line Reconfiguration (OLR) procedure (*i.e.*, Bit Swapping, SRA, and/or SOS). During an OLR procedure, a transceiver (VTU-O in the downstream direction and/or VTU-R in the upstream direction) first receives an OLR command from the other transceiver, and then responds with a Syncflag message, where the Syncflag is used as a time marker for a transition. *See* G.993.2 (2011), § 11.2.3.2 (p.103, Table 11-2) (describing a response to an OLR command as including a "Syncflag" for "marking the instant of re-configuration"). *See also id.* at § 11.2.3.3 (describing that in response to an OLR command, a VTU should either reject the request with reason codes "or positively acknowledge the initiator's request by transmitting a time marker for the reconfiguration. The time marker shall be communicated by transmission of a Syncflag (see clause 10.5.3).").

**Exhibit C – Claim Chart for U.S. Patent No. 7,817,532
as applied to Frontier with respect to VDSL2**

`532 Patent, Claim 6	VDSL2[1]
[d] utilizing, by the transceiver, the different allocation of bits to communicate with the other transceiver after a predetermined number of frames following transmission of the flag.	A VTU-O (in the downstream direction) and/or a VTU-R (in the upstream direction) utilize the different allocation of bits to communicate with the other transceiver after a predetermined number of frames following transmission of the flag when performing any On-line Reconfiguration ("OLR") operation (*i.e.*, Bit Swapping, SRA, and/or SOS).
	A VDSL2 transceiver (a VTU-O in the downstream direction and/or a VTU-R in the upstream direction) performing a type 1 OLR (*i.e.*, Bit Swapping), utilizes the different allocation of bits to communicate with the other transceiver after 9 frames (*i.e.*, starting with the *tenth frame*) following the transmission of the Syncflag. *See* G.993.2 (2011) at § 13.3 (p.278); *id.* at § 11.2.3.3 (pp.106-107, Table 11-6) (describing different types of OLR comments sent by the initiating VTU). *See also id.* at § 10.2 & Fig. 10-2.
	A VDSL2 transceiver (a VTU-O in the downstream direction and/or a VTU-R in the upstream direction) performing a type 3 OLR (*i.e.*, SRA), utilizes the different allocation of bits to communicate with the other transceiver after 65 frames (*i.e.*, starting with the *66th frame*) following the transmission of the Syncflag. *See* G.993.2 (2011) at § 13.3 (p.278); *id.* at § 11.2.3.3 (pp.106-107, Table 11-6) (describing different types of OLR comments sent by the initiating VTU). *See also id.* at § 10.2 & Fig. 10-2.
	A VDSL2 transceiver (a VTU-O in the downstream direction and/or a VTU-R in the upstream direction) performing a type 4 OLR (*i.e.*, SOS), utilizes the different allocation of bits to communicate with the other transceiver after 65 frames (*i.e.*, starting with the *66th frame*) following the transmission of the Syncflag. *See* G.993.2 (2011) at § 13.3 (p.278); *id.* at § 11.2.3.3 (pp.106-107, Table 11-6) (describing different types of OLR comments sent by the initiating VTU). *See also id.* at § 10.2 & Fig. 10-2.
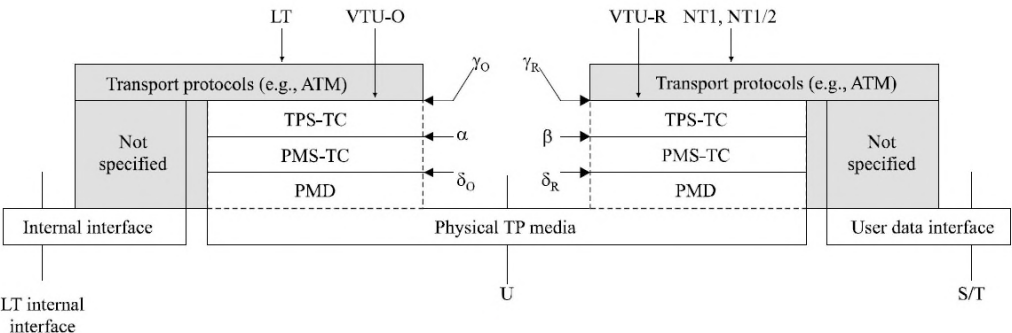
Exhibit C – Claim Chart for U.S. Patent No. 7,817,532
as applied to Frontier with respect to VDSL2

`532 Patent, Claim 7	VDSL2
7. The method of claim 6, further comprising receiving the different allocation of bits from the other transceiver.	*See* discussions of claim 6, above. This claim is infringed by a VTU-O and/or VTU-R performing an On-Line Reconfiguration ("OLR") operation (*i.e.*, Bit Swapping, SRA, and/or SOS). *See* G.993.2 (2011), § 13.1 *et seq.* (describing On-line Reconfiguration operations). During an OLR operation, a VTU-O (in the downstream direction) and/or a VTU-R (in the upstream direction) receive the different allocation of bits from the other transceiver. During an OLR procedure (*i.e.*, Bit Swapping, SRA, and/or SOS), a VDSL2 transceiver (VTU-O in the downstream direction and/or VTU-R in the upstream direction) receives an OLR command from another transceiver on the other side of the VDSL2 link. The received OLR command includes all necessary PMD control values, which includes the different allocation of bits. *See* G.993.2 (2011), § 11.2.3.2 (p.103, Table 11-2) (describing an OLR command as containing "[a]ll the necessary PMD and PMS-TC control parameter values for the new configuration," including the different allocation of bits.). The OLR command received by the transmitter portion of the VTU-O and/or VTU-R includes a plurality of octets describing subcarrier parameter fields for each subcarrier of the VDSL2 multicarrier system, where the subcarrier parameter fields describe the different allocation of bits for the transceiver. *See* G.993.2 (2011), § 11.2.3.3 (pp.106-107, Table 11-6) (type 1 (Bitswap) and type 3 (SRA) OLR commands include "4 x N_f octets describing subcarrier parameter field for each subcarrier" is defined as being sent by the receiver; type 4 (SOS) OLR command include "4 to $N_{TG}/2+3$" octets describing the changes of each element b_i in the bit allocation table b). *See also id.*, p.108 (describing that the subcarrier parameter fields in the OLR message received by a VTU-O and/or VTU-R "shall contain 4 octets formatted as [0000 iiii iiii iiii gggg gggg gggg bbbb] to convey the g_i (12 bits) and the b_i (4 bits) values of the subcarrier index i (12 bits)," where parameters b_i specify the different allocation of bits for the transceiver.); G.993.2 (2011), § 13.4 (p.280) (describing that during a receiver initiated OLR procedure (*i.e.*, Bit Swapping, SRA, and/or SOS), a transmitting VTU (VTU-O and/or VTU-R) receives "necessary changes in related parameters (e.g., bits and gains table)" from the receiving VTU.).

**Exhibit C – Claim Chart for U.S. Patent No. 7,817,532
as applied to Frontier with respect to VDSL2**

`532 Patent, Claim 9	VDSL2
9. A method, comprising: [a] utilizing, by a transceiver, a first allocation of bits to subchannels of a multicarrier modulation system to communicate with another transceiver;	Accused instrumentalities compliant with the ITU-T Recommendation G.993.2 standard ("VDSL2-compliant") comprise a transceiver, *i.e.*, a device that both transmits and receives, that establishes a communication link with another VDSL2 transceiver via a metallic twisted pair. A VDSL2 transceiver is commonly referred to as a VTU. *See* ITU-T Recommendation G.993.2, December 2011 ("G.993.2 (2011)"), Summary (p. i); *id.* at § 4 ("Abbreviations") p. 11 (defining "VTU" as a "VDSL2 Transceiver Unit"). The VDSL transceiver located at the service provider's location is commonly called the "VTU-O" and the VDSL transceiver located at the subscriber's location is commonly called the "VTU-R." *See* G.993.2 (2011), § 4 ("Abbreviations"), p. 11 (defining "VTU" as "VDSL2 Transceiver Unit;" defining "VTU-O" as "VTU at the Optical Network Unit (or central office, exchange, cabinet, etc., i.e., operator end of the loop);" defining "VTU-R" as "VTU at the Remote site (i.e., subscriber end of the loop)"). This claim is infringed by a VTU-O (in the upstream direction) and/or VTU-R (in the downstream direction) performing any On-line Reconfiguration (OLR) operation (*i.e.*, Bit Swapping, Seamless Rate Adaptation ("SRA"), and/or Save Our Showtime ("SOS")). *See* G.993.2 (2011), § 13.1 *et seq.* (describing On-line Reconfiguration operations). A VDSL2 transceiver (a VTU-O in the upstream direction and/or a VTU-R in the downstream direction) utilizes a first allocation of bits to subchannels of a multicarrier modulation system to communicate with another transceiver when performing any On-line Reconfiguration (OLR) operation (*i.e.*, Bit Swapping, SRA, and/or SOS). A first allocation of bits is utilized by a VTU-O and/or VTU-R to transmit bits prior to the performance of an OLR operation. The first allocation of bits to subchannels is often determined during an initialization procedure. *See* G.993.2 (2011), § 10.3.1 (p. 78) ("During initialization, the receive PMD function shall calculate the numbers of bits and the relative gains to be used for every subcarrier. . . . The calculated bits and gains and the tone ordering shall be sent back to the transmit PMD function during the channel analysis and exchange phase of initialization. . . . The pairs of bits and relative gains are defined . . . as a bit allocation table *b* and gain table *g*. (*i.e.*, b_i and g_i, for all subcarrier indices *i* that belong to the MEDLEY set)."). The first allocation of bits is also sometimes determined by a previous reconfiguration of the subchannel parameters during data communication between a VTU-O and a VTU-R, wherein the first allocation of bits to subchannels is specified at least in part by the control parameters associated with a previous reconfiguration. *See* G.993.2 (2011), § 13.2.1 (p. 276, Table 13-1) (describing reconfigurable control parameters of the PMD function, including b_i). VDSL2 transceivers (VTU-O and/or VTU-R) are multicarrier in nature (*i.e.*, the transceivers communicate with each other using a plurality of discrete frequency subchannels), as they transmit and receive Discrete Multi-tone ("DMT," *see* G.993.2 (2011) at § 4) signals carrying bits modulated across a plurality of subcarriers. *See id.* at § 10.1 (describing PMD sublayer of VDSL2 transceivers, and noting: "The functional model of the PMD sublayer is presented in Figure 10-1. In the transmit direction, the PMD sublayer receives input data frames from the PMS-TC sublayer via the δ interface as specified in clause 9.1. Each data frame contains an integer number of data bits equal to L0 + L1 to be modulated onto one DMT symbol."); *id.* at § 10.4.1 (under Modulation heading, describing "Data subcarriers"). *See also id.* at § 3.17 (defining "DMT symbol" as "The time-domain samples emerging from the DMT modulator during one symbol period, following insertion of the cyclic extension and completion of the

**Exhibit C – Claim Chart for U.S. Patent No. 7,817,532
as applied to Frontier with respect to VDSL2**

`532 Patent, Claim 9	VDSL2
	windowing and overlap-and-add operations (see clause 10.4.4). During showtime, there are two types of DMT symbols: data symbols and sync symbols."); *id.* at § 3.56 (defining "subcarrier" as "A fundamental element of a discrete multi-tone (DMT) modulator. The modulator partitions the channel bandwidth into a set of parallel subchannels. The centre frequency of each subchannel is a subcarrier, onto which bits may be modulated for transmission over a channel (see clause 10)."). A VDSL2 transceiver (VTU-O and/or VTU-R) communicates with another VDSL2 transceiver in a multicarrier modulation system by transmitting and/or receiving a multicarrier signal to and/or from another transceiver. *See, e.g.,* G.993.2 (2011), §§ 10.4.1 – 10.4.3 (pp. 93-94) (describing that the data subcarriers are "indexed from $i=0$ to $i=MSI$," and "[t]he IDFT is used to modulate the output of the symbol encoder to the DMT subcarriers."). *See also id.* at §§ 10.3 *et seq.* and 10.4 *et seq.* A VDSL2 transceiver (VTU-O and/or VTU-R) communicates with another VDSL2 transceiver (VTU-R and/or VTU-O) through a physical media such as a metallic twisted pair. *See, e.g.,* G.993.2 (2011), §§ 5.2-5.4 (pp. 13-19) and Figure 5-2 (p. 13). **Figure 5-2 – User plane protocol reference model**
[b] selecting, by the transceiver, a different allocation of bits to subchannels; and	A VDSL2 transceiver (a VTU-O in the upstream direction and/or a VTU-R in the downstream direction) selects a different allocation of bits to subchannels when performing any On-line Reconfiguration (OLR) operation (*i.e.*, Bit Swapping, SRA, and/or SOS). An allocation of bits to subcarriers that differs in some way from the previous allocation of bits is selected as part of the performance of an OLR operation. The VTU-R and VTU-O are programmed to perform a variety of OLR operations (including Bit Swapping, SRA, and/or SOS) that change transmission parameters. *See* G.993.2 (2011) at § 13.1 *et seq.* These operations changes transmission parameters including, *inter alia*, the bits per subcarrier (b_i) and the fine gain for each subcarrier (g_i). *See id.* During an OLR procedure (*i.e.*, Bit Swapping, SRA, and/or SOS), a VDSL2 transceiver (VTU-O in the upstream direction and/or a VTU-R in the downstream direction) determines and selects a different allocation of bits to subchannels, by selecting new b_i parameters, which specify the number of bits to be allocated to each subchannel of the multicarrier system. *See* G.993.2 (2011), at § 13.2.1 (p. 276, Table 13-1) (describing reconfigurable control parameters of the PMD function, including b_i). A VTU-O in the upstream direction and/or a VTU-R in the downstream direction first determines the different allocation of bits to subchannels to be used, and then sends the different allocation of bits to the other transceiver in the communications link. *See id.* at § 11.2.3.3. Upon receiving acknowledgment from the other

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`532 Patent, Claim 9	VDSL2
	transceiver in the form of a Syncflag, a VTU-O in the upstream direction and/or a VTU-R in the downstream direction selects the different allocation of bits to be subsequently utilized for communication. *See id.* at § 11.2.3.2 (Table 11-2); *id.* at § 13.3.
[c] utilizing, by the transceiver upon reception of a flag from the other transceiver, the different allocation of bits to subchannels to communicate with the other transceiver after a predetermined number of frames following the reception of the flag.	A VDSL2 transceiver (a VTU-O in the upstream direction and/or a VTU-R in the downstream direction) unitizes, upon reception of a flag from the other transceiver, a different allocation of bits to subchannels to communicate with the other transceiver after a predetermined number of frames following the reception of the flag, when performing any On-line Reconfiguration ("OLR") operation (*i.e.*, Bit Swapping, SRA, and/or SOS).

During an OLR procedure, a flag message is used to coordinate a time for VDSL2 transceivers (VTU-O and VTU-R) to start utilizing the different allocation of bits. The flag received by a VDSL2 transceiver (VTU-O in the upstream direction and/or a VTU-R in the downstream direction) during an OLR procedure comprises a Syncflag message from the other VDSL2 transceiver on the other side of the communication link. During an OLR procedure, a transceiver (VTU-O in the upstream direction and/or VTU-R in the downstream direction) first transmits an OLR command to the other transceiver, and then receives a Syncflag message from the other transceiver in response, where the Syncflag is used as a time marker for a transition. *See* G.993.2 (2011), § 11.2.3.2 (p.103, Table 11-2) (describing a response to an OLR command as including a "Syncflag" for "marking the instant of re-configuration"). *See also id.* at § 11.2.3.3 (describing that in response to an OLR command, a VTU should either reject the request with reason codes "or positively acknowledge the initiator's request by transmitting a time marker for the reconfiguration. The time marker shall be communicated by transmission of a Syncflag (see clause 10.5.3).").

A VDSL2 transceiver (a VTU-O in the upstream direction and/or a VTU-R in the downstream direction) performing a type 1 OLR (*i.e.*, Bit Swapping), utilizes a different allocation of bits to communicate with the other transceiver after 9 frames (*i.e.*, starting with the *tenth frame*) following the reception of the Syncflag. *See* G.993.2 (2011) at § 13.3 (p.278); *id.* at § 11.2.3.3 (pp.106-107, Table 11-6) (describing different types of OLR comments sent by the initiating VTU). *See also id.* at § 10.2 & Fig. 10-2.

A VDSL2 transceiver (a VTU-O in the upstream direction and/or a VTU-R in the downstream direction) performing a type 3 OLR (*i.e.*, SRA), utilizes a different allocation of bits to communicate with the other transceiver after 65 frames (*i.e.*, starting with the *66th frame*) following the reception of the Syncflag. *See* G.993.2 (2011) at § 13.3 (p.278); *id.* at § 11.2.3.3 (pp.106-107, Table 11-6) (describing different types of OLR comments sent by the initiating VTU). *See also id.* at § 10.2 & Fig. 10-2.

A VDSL2 transceiver (a VTU-O in the upstream direction and/or a VTU-R in the downstream direction) performing a type 4 OLR (*i.e.*, SOS), utilizes a different allocation of bits to communicate with the other transceiver after 65 frames (*i.e.*, starting with the *66th frame*) following the reception of the Syncflag. *See* G.993.2 (2011) at § 13.3 (p.278); *id.* at § 11.2.3.3 (pp.106-107, Table 11-6) (describing different types of OLR comments sent by the initiating VTU). *See also id.* at § 10.2 & Fig. 10-2. |

**Exhibit C – Claim Chart for U.S. Patent No. 7,817,532
as applied to Frontier with respect to VDSL2**

`532 Patent, Claim 12	VDSL2
12. The method of claim 9, further comprising transmitting, by the transceiver, the second allocation of bits to the other transceiver based at least on a monitored state of the multicarrier modulation system.	*See* discussion of claim 9, above. This claim is infringed by a VTU-O (in the upstream direction) and/or VTU-R (in the downstream direction) performing any On-line Reconfiguration (OLR) operation (*i.e.*, Bit Swapping, Seamless Rate Adaptation ("SRA"), and/or Save Our Showtime ("SOS")). *See* G.993.2 (2011), § 13.1 *et seq.* (describing On-line Reconfiguration operations). A VDSL2 transceiver (a VTU-O in the upstream direction and/or a VTU-R in the downstream direction) transmits the second allocation of bits to the other transceiver based at least on a monitored state of the multicarrier modulation system when performing any On-line Reconfiguration (OLR) operation (*i.e.*, Bit Swapping, SRA, and/or SOS). A VDSL2 transceiver (a VTU-O in the upstream direction and/or a VTU-R in the downstream direction) transmits the second allocation of bits to the other transceiver. During an OLR procedure (*i.e.*, Bit Swapping, SRA, and/or SOS), a VDSL2 transceiver (a VTU-O in the upstream direction and/or a VTU-R in the downstream direction) transmits an OLR command to another transceiver on the other side of the VDSL2 link. The transmitted OLR command includes all necessary PMD control values, which includes a second allocation of bits. *See* G.993.2 (2011), § 11.2.3.2 (p.103, Table 11-2) (describing an OLR command as containing "[a]ll the necessary PMD and PMS-TC control parameter values for the new configuration," including the second allocation of bits.). The OLR command transmitted by the transmitter portion of the transceiver (VTU-O in the upstream direction and/or VTU-R in the downstream direction) includes a plurality of octets[2] describing subcarrier parameter fields for each subcarrier of the VDSL2 multicarrier system, where the subcarrier parameter fields describe the second allocation of bits for the transceiver. *See* G.993.2 (2011), § 11.2.3.3 (pp.106-107, Table 11-6) (type 1 (Bitswap) and type 3 (SRA) OLR commands include "4 x N_f octets describing subcarrier parameter field for each subcarrier" is defined as being sent by the receiver; type 4 (SOS) OLR command include "4 to $N_{TG}/2+3$" octets describing the changes of each element b_i in the bit allocation table b). *See also id.*, p.108 (describing that the subcarrier parameter fields in the OLR message received by a VTU-O and/or VTU-R "shall contain 4 octets formatted as [0000 iiii iiii iiii gggg gggg gggg bbbb] to convey the g_i (12 bits) and the b_i (4 bits) values of the subcarrier index i (12 bits)," where parameters b_i specify the different allocation of bits for the transceiver.); *id.* at § 13.4 (p.280) (describing that during a receiver initiated OLR procedure (*i.e.*, Bit Swapping, SRA, and/or SOS), a transmitting VTU (VTU-O and/or VTU-R) receives "necessary changes in related parameters (e.g., bits and gains table)" from the receiving VTU.). Transmission of a different allocation of bits by a VDSL2 transceiver (a VTU-O in the upstream direction and/or a VTU-R in the downstream direction) to another transceiver based at least on a monitored state of the multicarrier modulation system. When performing and OLR operation (*i.e.*, Bit Swapping, SRA, and/or SOS), a VDSL2 transceiver (VTU-O in the upstream direction and/or VTU-R in the downstream direction) monitors the state of the multicarrier modulation system and selects and transmits a

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[2] An octet is a group of eight bits, also commonly referred to as a "byte."

Exhibit C – Claim Chart for U.S. Patent No. 7,817,532
as applied to Frontier with respect to VDSL2

`532 Patent, Claim 12	VDSL2
	second/different allocation of bits based on the monitored state. Monitoring of the state of the multicarrier modulation system by a VDSL2 transceiver (VTU-O in the upstream direction and/or VTU-R in the downstream direction) can be performed, for example, by monitoring the conditions of signals (*e.g.,* line and noise conditions) received over the communication channel using operation and maintenance (OAM) parameters. *See* G.993.2 (2011), § 11.4 (pp. 132–163); *see also id.* at § 11.4.1 (pp. 132-133) (describing that test parameters can be used to monitor channel conditions of the communication channel, such as test parameter Channel Characteristics Function H(f) per subcarrier (CCF-ps), which can be used to monitor "the physical copper loop condition," test parameter "Quiet Line Noise PSD QLN(f) per subcarrier (QLN-ps)," which can be used to monitor "the crosstalk," and test parameter "Signal-to-Noise Ratio SNR(f) per subcarrier (SNR-ps)," which can be used to monitor "time-dependent changes in crosstalk levels and line attenuation . . ."). *See also* G.997.1 (2006), §§ 7.3.1.4, *et seq.*, 7.5.1.13, 7.5.1.14. Selecting a different allocation of bits in response to monitoring the multicarrier modulation system may also be performed according to an "SRA upshift procedure" or "SRA downshift procedure." *See id.* at § 13.4.

EXHIBIT D

**Exhibit D – Claim Chart for U.S. Patent No. 7,272,171
as applied to Frontier with respect to ADSL2/+**

'171 Patent, Claim 2	ADSL2/+[1]
2. [**Infringement Scenario #1**] In a multicarrier transceiver, a variable state length initialization method comprising:	Products compliant with the ITU-T Recommendation G.992.3 standard comprise a transceiver – a device that both transmits and receives – that establishes a communication link with a transceiver of another product compliant with the ITU-T Recommendation G.992.3 standard using a prescribed method. ITU-T Recommendation G.992.3 (2005) Summary (p. i). "ATU," "ATU-C," and "ATU-R" are accepted abbreviations for the transceivers. ITU-T Recommendation G.992.3 (2005) § 4 (p. 6) ("ATU-C [is an abbreviation for] ATU at the central office end (i.e., network operator)," and "ATU-R [is an abbreviation for] ATU at the remote terminal end (i.e., CP)."). A transceiver transmits and receives a multicarrier signal. The transceiver produces this signal by modulating signal constellation points on multiple subcarrier frequencies and summing the result into a DMT symbol for simultaneous transmission. ITU-T Recommendation G.992.3 (2005) §§ 8.8 (p. 89) and 8.8.1 (p. 89). **8.8 Modulation** The modulator shall modulate a constellation encoder output data frame or sync frame (containing $NSC - 1$ complex values Z_i, $i = 1$ to $NSC - 1$) into a DMT symbol. The data frame can be taken **8.8.1 Subcarriers** A DMT symbol consists of a set of subcarriers, with index $i = 0$ to NSC. The DMT subcarriers spacing Δf, shall be 4.3125 kHz, with a tolerance of $\pm$ 50 ppm. The subcarrier frequencies shall be An ATU-C establishes a communication link with an ATU-R. ITU-T Recommendation G.992.3 (2005) § 8.13.1.1 (p. 104). **8.13.1.1 Basic functions of initialization** ADSL transceiver initialization is required in order for a physically connected ATU-R and ATU-C pair to establish a communications link. The procedures for initiating a connection are specified in A transceiver uses the initialization method specified in ITU-T Recommendation G.993.2 for both full (§ 8.13) and short (§ 8.14) initialization, which are variable state length initializations because, for some initialization states, the transceiver can change the length of the initialization state by performing the steps recited in the body of the claim. ITU-T Recommendation G.992.3 (2005) § 8.13.7 (p. 143).
[a] transmitting to a second multicarrier transceiver information identifying a first value that is used to determine a	The ATU-C transmits the information C-MSG1 that identifies a first value (CA-MEDLEYus). This first value is used to determine a first minimum number of multicarrier symbols, 512 * CA-MEDLEYus. ITU-T Recommendation G.992.3 (2005) § 8.5.3.2 (p. 69) and Table 8-12 (p. 70).

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[1]   Relevant features of the ADSL2 standard are described in documents including but not limited to G.992.3 (2005) and G.992.3 (2009). These infringement contentions cite to the ADSL2 standard; however, they also apply to the ADSL2+ (G.992.5) standard. ADSL2+ is a superset of ADSL2, and the features pertinent to infringement are common to both. *See* G.992.5 ("This Recommendation is written as a delta Recommendation relative to Recommendation ITU-T Rec. G.992.3. For the clauses which have been changed, this Recommendation contains complete replacement text (unless explicitly indicated). For the clauses which have not been changed, this Recommendation contains only the clause heading, with reference to Recommendation ITU-T G.992.3.").

'171 Patent, Claim 2	ADSL2/+[1]
first minimum number of multicarrier symbols;	The value *CA-MEDLEY* represents the minimum duration (in multiples of 512 symbols) of the MEDLEY state during the Initialization Channel Analysis Phase. It can be different for the ATU-C (*CA-MEDLEYus* indicates the minimum length of the R-MEDLEY state) and the ATU-R (*CA-MEDLEYds* indicates the minimum length of the C-MEDLEY state). See 8.13.5.1.4 and 8.13.5.2.4.

The PMD function control parameters exchanged in the C-MSG1 message are listed in Table 8-12.

Table 8-12/G.992.3 – PMD function control parameters included in C-MSG1

Octet Nr [i]	Parameter	PMD format bits [8 × i + 7 to 8 × i + 0]
0	*TARSNRMds* (LSB)	[xxxx xxxx], bit 7 to 0
1	*TARSNRMds* (MSB)	[0000 00xx], bit 8
2	*MINSNRMds* (LSB)	[xxxx xxxx], bit 7 to 0
3	*MINSNRMds* (MSB)	[0000 000x], bit 8
4	*MAXSNRMds* (LSB)	[xxxx xxxx], bit 7 to 0
5	*MAXSNRMds* (MSB)	[0000 000x], bit 8
6	*RA-MODEds*	[0000 00xx], bit 1 to 0
7	*PM-MODE*	[0000 00xx], bit 1 to 0
8	*RA-USNRMds* (LSB)	[xxxx xxxx], bit 7 to 0
9	*RA-USNRMds* (MSB)	[0000 000x], bit 8
10	*RA-UTIMEds* (LSB)	[xxxx xxxx], bit 7 to 0
11	*RA-UTIMEds* (MSB)	[00xx xxxx], bit 13 to 8
12	*RA-DSNRMds* (LSB)	[xxxx xxxx], bit 7 to 0
13	*RA-DSNRMds* (MSB)	[0000 000x], bit 8
14	*RA-DTIMEds* (LSB)	[xxxx xxxx], bit 7 to 0
15	*RA-DTIMEds* (MSB)	[00xx xxxx], bit 13 to 8
16	*BIMAXds*	[0000 xxxx], bit 3 to 0
17	*EXTGIds*	[xxxx xxxx], bit 7 to 0
18	*CA-MEDLEYus*	[00xx xxxx], bit 5 to 0

'171 Patent, Claim 2	ADSL2/+
[b] receiving from the second multicarrier transceiver information identifying a second value that is used to determine a second minimum number of multicarrier symbols;	The ATU-C receives the information R-MSG1 that identifies a second value (CA-MEDLEYds). This second value is used to determine a second minimum number of multicarrier symbols, 512 * CA-MEDLEYds. ITU-T Recommendation G.992.3 (2005) §§ 8.5.3.2 (p. 69) and 8.5.3.2 (p. 70), and Table 8-13 (p. 70).

The value *CA-MEDLEY* represents the minimum duration (in multiples of 512 symbols) of the MEDLEY state during the Initialization Channel Analysis Phase. It can be different for the ATU-C (*CA-MEDLEYus* indicates the minimum length of the R-MEDLEY state) and the ATU-R (*CA-MEDLEYds* indicates the minimum length of the C-MEDLEY state). See 8.13.5.1.4 and 8.13.5.2.4.

The PMD function control parameters exchanged in the C-MSG1 message are listed in Table 8-12.

The PMD function control parameters exchanged in the R-MSG1 message are listed in Table 8-13.

'171 Patent, Claim 2	ADSL2/+[1]
	Table 8-13/G.992.3 – PMD function control parameters included in R-MSG1

Table 8-13/G.992.3 – PMD function control parameters included in R-MSG1

Octet Nr [i]	Parameter	PMD format bits [8 × i + 7 to 8 × i + 0]
0	BIMAXus	[0000 xxxx], bit 3 to 0
1	EXTGIus	[xxxx xxxx], bit 7 to 0
2	CA-MEDLEYds	[00xx xxxx], bit 5 to 0

'171 Patent, Claim 2	ADSL2/+
[c] selecting the greater of the first minimum number of multicarrier symbols and the second minimum number of multicarrier symbols; and	The ATU-C selects the greater of CA-MEDLEYus and CA-MEDLEYds as the value for LEN_MEDLEY. ITU-T Recommendation G.992.3 (2005) § 8.13.5.1.4 (p. 135).

symbols. The value *LEN_MEDLEY* shall be the maximum of the CA-MEDLEYus and CA-MEDLEYds values indicated by the ATU-C and the ATU-R in the C-MSG1 and R-MSG1 messages respectively. The value *LEN_MEDLEY* shall be a multiple of 512 and shall be less than or

As explained in Sections 8.13.5.1.4 and 8.13.5.2.4, the value of LEN_MEDLEY is the maximum of CA-MEDLEYus, which is part of the C-MSG1 message, and CA-MEDLEYds, which is part of the R-MSG1 message. *See* ITU-T Recommendation G.992.3 (2005) Tables 8-12 (p. 70) and 8-13 (p. 70).

Table 8-12/G.992.3 – PMD function control parameters included in C-MSG1

Octet Nr [i]	Parameter	PMD format bits [8 × i + 7 to 8 × i + 0]
0	TARSNRMds (LSB)	[xxxx xxxx], bit 7 to 0
1	TARSNRMds (MSB)	[0000 00xx], bit 8
2	MINSNRMds (LSB)	[xxxx xxxx], bit 7 to 0
3	MINSNRMds (MSB)	[0000 000x], bit 8
4	MAXSNRMds (LSB)	[xxxx xxxx], bit 7 to 0
5	MAXSNRMds (MSB)	[0000 000x], bit 8
6	RA-MODEds	[0000 00xx], bit 1 to 0
7	PM-MODE	[0000 00xx], bit 1 to 0
8	RA-USNRMds (LSB)	[xxxx xxxx], bit 7 to 0
9	RA-USNRMds (MSB)	[0000 000x], bit 8
10	RA-UTIMEds (LSB)	[xxxx xxxx], bit 7 to 0
11	RA-UTIMEds (MSB)	[00xx xxxx], bit 13 to 8
12	RA-DSNRMds (LSB)	[xxxx xxxx], bit 7 to 0
13	RA-DSNRMds (MSB)	[0000 000x], bit 8
14	RA-DTIMEds (LSB)	[xxxx xxxx], bit 7 to 0
15	RA-DTIMEds (MSB)	[00xx xxxx], bit 13 to 8
16	BIMAXds	[0000 xxxx], bit 3 to 0
17	EXTGIds	[xxxx xxxx], bit 7 to 0
18	CA-MEDLEYus	[00xx xxxx], bit 5 to 0

'171 Patent, Claim 2	ADSL2/+
[d] transmitting to the second multicarrier transceiver, during an initialization state, the selected number of	The ATU-C transmits the selected number (LEN_MEDLEY) of multicarrier symbols during the C-MEDLEY initialization state. ITU-T Recommendation G.992.3 (2005) § 8.13.5.1.4 (p. 135).

'171 Patent, Claim 2	ADSL2/+[1]
multicarrier symbols.	**8.13.5.1.4 C-MEDLEY** The C-MEDLEY state is of fixed length. In this state, the ATU-C shall transmit *LEN_MEDLEY* symbols. The value *LEN_MEDLEY* shall be the maximum of the CA-MEDLEYus and

'171 Patent, Claim 3	ADSL2/+
3. [**Infringement Scenario #1**] In a multicarrier transceiver, a variable state length initialization method comprising:	Products compliant with the ITU-T Recommendation G.992.3 standard comprise a transceiver – a device that both transmits and receives – that establishes a communication link with a transceiver of another product compliant with the ITU-T Recommendation G.992.3 standard using a prescribed method. ITU-T Recommendation G.992.3 (2005) Summary (p. i). "ATU," "ATU-C," and "ATU-R" are accepted abbreviations for the transceivers. ITU-T Recommendation G.992.3 (2005) § 4 (p. 6) ("ATU-C [is an abbreviation for] ATU at the central office end (i.e., network operator)," and "ATU-R [is an abbreviation for] ATU at the remote terminal end (i.e., CP)."). A transceiver transmits and receives a multicarrier signal. The transceiver produces this signal by modulating signal constellation points on multiple subcarrier frequencies and summing the result into a DMT symbol for simultaneous transmission. ITU-T Recommendation G.992.3 (2005) §§ 8.8 (p. 89) and 8.8.1 (p. 89). **8.8 Modulation** The modulator shall modulate a constellation encoder output data frame or sync frame (containing $NSC - 1$ complex values Z_i, $i = 1$ to $NSC - 1$) into a DMT symbol. The data frame can be taken **8.8.1 Subcarriers** A DMT symbol consists of a set of subcarriers, with index $i = 0$ to NSC. The DMT subcarriers spacing Δf, shall be 4.3125 kHz, with a tolerance of $\pm$ 50 ppm. The subcarrier frequencies shall be An ATU-C establishes a communication link with an ATU-R. ITU-T Recommendation G.992.3 (2005) § 8.13.1.1 (p. 104). **8.13.1.1 Basic functions of initialization** ADSL transceiver initialization is required in order for a physically connected ATU-R and ATU-C pair to establish a communications link. The procedures for initiating a connection are specified in A transceiver uses the initialization method specified in ITU-T Recommendation G.993.2 for both full (§ 8.13) and short (§ 8.14) initialization, which are variable state length initializations because, for some initialization states, the transceiver can change the length of the initialization state by performing the steps recited in the body of the claim. ITU-T Recommendation G.992.3 (2005) § 8.13.7 (p. 143).
[a] transmitting to a second multicarrier transceiver information identifying a first value that is used to determine a first minimum number of multicarrier symbols;	The ATU-C transmits the information C-MSG1 that identifies a first value (CA-MEDLEYus). This first value is used to determine a first minimum number of multicarrier symbols, 512 * CA-MEDLEYus. ITU-T Recommendation G.992.3 (2005) § 8.5.3.2 (p. 69) and Table 8-12 (p. 70). The value *CA-MEDLEY* represents the minimum duration (in multiples of 512 symbols) of the MEDLEY state during the Initialization Channel Analysis Phase. It can be different for the ATU-C (*CA-MEDLEYus* indicates the minimum length of the R-MEDLEY state) and the ATU-R (*CA-MEDLEYds* indicates the minimum length of the C-MEDLEY state). See 8.13.5.1.4 and 8.13.5.2.4. The PMD function control parameters exchanged in the C-MSG1 message are listed in Table 8-12.

'171 Patent, Claim 3	ADSL2/+
	Table 8-12/G.992.3 – PMD function control parameters included in C-MSG1

Octet Nr [i]	Parameter	PMD format bits [8 × i + 7 to 8 × i + 0]
0	TARSNRMds (LSB)	[xxxx xxxx], bit 7 to 0
1	TARSNRMds (MSB)	[0000 00xx], bit 8
2	MINSNRMds (LSB)	[xxxx xxxx], bit 7 to 0
3	MINSNRMds (MSB)	[0000 000x], bit 8
4	MAXSNRMds (LSB)	[xxxx xxxx], bit 7 to 0
5	MAXSNRMds (MSB)	[0000 000x], bit 8
6	RA-MODEds	[0000 00xx], bit 1 to 0
7	PM-MODE	[0000 00xx], bit 1 to 0
8	RA-USNRMds (LSB)	[xxxx xxxx], bit 7 to 0
9	RA-USNRMds (MSB)	[0000 000x], bit 8
10	RA-UTIMEds (LSB)	[xxxx xxxx], bit 7 to 0
11	RA-UTIMEds (MSB)	[00xx xxxx], bit 13 to 8
12	RA-DSNRMds (LSB)	[xxxx xxxx], bit 7 to 0
13	RA-DSNRMds (MSB)	[0000 000x], bit 8
14	RA-DTIMEds (LSB)	[xxxx xxxx], bit 7 to 0
15	RA-DTIMEds (MSB)	[00xx xxxx], bit 13 to 8
16	BIMAXds	[0000 xxxx], bit 3 to 0
17	EXTGIds	[xxxx xxxx], bit 7 to 0
18	CA-MEDLEYus	[00xx xxxx], bit 5 to 0

'171 Patent, Claim 3	ADSL2/+
[b] receiving from the second multicarrier transceiver information identifying a second value that is used to determine a second minimum number of multicarrier symbols;	The ATU-C receives information R-MSG1 that identifies a second value (CA-MEDLEYds). This second value is used to determine a second minimum number of multicarrier symbols, 512 * CA-MEDLEYds. ITU-T Recommendation G.992.3 (2005) §§ 8.5.3.2 (p. 69) and 8.5.3.2 (p. 70), and Table 8-13 (p. 70). The value *CA-MEDLEY* represents the minimum duration (in multiples of 512 symbols) of the MEDLEY state during the Initialization Channel Analysis Phase. It can be different for the ATU-C (*CA-MEDLEYus* indicates the minimum length of the R-MEDLEY state) and the ATU-R (*CA-MEDLEYds* indicates the minimum length of the C-MEDLEY state). See 8.13.5.1.4 and 8.13.5.2.4. The PMD function control parameters exchanged in the C-MSG1 message are listed in Table 8-12. The PMD function control parameters exchanged in the R-MSG1 message are listed in Table 8-13.

Table 8-13/G.992.3 – PMD function control parameters included in R-MSG1

Octet Nr [i]	Parameter	PMD format bits [8 × i + 7 to 8 × i + 0]
0	BIMAXus	[0000 xxxx], bit 3 to 0
1	EXTGIus	[xxxx xxxx], bit 7 to 0
2	CA-MEDLEYds	[00xx xxxx], bit 5 to 0

'171 Patent, Claim 3	ADSL2/+
[c] selecting a number equal to the greater of the first minimum number of multicarrier symbols and the second minimum	The ATU-C selects the greater of CA-MEDLEYus and CA-MEDLEYds as the value for LEN_MEDLEY. ITU-T Recommendation G.992.3 (2005) § 8.13.5.1.4 (p. 135).

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'171 Patent, Claim 3	ADSL2/+
number of multicarrier symbols; and	symbols. The value *LEN_MEDLEY* shall be the maximum of the CA-MEDLEYus and CA-MEDLEYds values indicated by the ATU-C and the ATU-R in the C-MSG1 and R-MSG1 messages respectively. The value *LEN_MEDLEY* shall be a multiple of 512 and shall be less than or As explained in Sections 8.13.5.1.4 and 8.13.5.2.4, the value of LEN_MEDLEY is the maximum of CA-MEDLEYus, which is part of the C-MSG1 message, and CA-MEDLEYds, which is part of the R-MSG1 message. *See* ITU-T Recommendation G.992.3 (2005) Tables 8-12 (p. 70) and 8-13 (p. 70). **Table 8-12/G.992.3 – PMD function control parameters included in C-MSG1** **Table 8-13/G.992.3 – PMD function control parameters included in R-MSG1**
[d] receiving from the second multicarrier transceiver, during an initialization state, the selected number of multicarrier symbols.	The ATU-C receives the selected number (LEN_MEDLEY) of multicarrier symbols during the R-MEDLEY initialization state. ITU-T Recommendation G.992.3 (2005) § 8.13.5.2.4 (p. 137). **8.13.5.2.4 R-MEDLEY** The R-MEDLEY state is of fixed length. In this state, the ATU-R shall transmit *LEN_MEDLEY* symbols. The value *LEN_MEDLEY* shall be the maximum of the CA-MEDLEYus and

Table 8-12/G.992.3 – PMD function control parameters included in C-MSG1

Octet Nr [i]	Parameter	PMD format bits [8 × i + 7 to 8 × i + 0]
0	TARSNRMds (LSB)	[xxxx xxxx], bit 7 to 0
1	TARSNRMds (MSB)	[0000 00xx], bit 8
2	MINSNRMds (LSB)	[xxxx xxxx], bit 7 to 0
3	MINSNRMds (MSB)	[0000 000x], bit 8
4	MAXSNRMds (LSB)	[xxxx xxxx], bit 7 to 0
5	MAXSNRMds (MSB)	[0000 000x], bit 8
6	RA-MODEds	[0000 00xx], bit 1 to 0
7	PM-MODE	[0000 00xx], bit 1 to 0
8	RA-USNRMds (LSB)	[xxxx xxxx], bit 7 to 0
9	RA-USNRMds (MSB)	[0000 000x], bit 8
10	RA-UTIMEds (LSB)	[xxxx xxxx], bit 7 to 0
11	RA-UTIMEds (MSB)	[00xx xxxx], bit 13 to 8
12	RA-DSNRMds (LSB)	[xxxx xxxx], bit 7 to 0
13	RA-DSNRMds (MSB)	[0000 000x], bit 8
14	RA-DTIMEds (LSB)	[xxxx xxxx], bit 7 to 0
15	RA-DTIMEds (MSB)	[00xx xxxx], bit 13 to 8
16	BIMAXds	[0000 xxxx], bit 3 to 0
17	EXTGIds	[xxxx xxxx], bit 7 to 0
18	CA-MEDLEYus	[00xx xxxx], bit 5 to 0

Table 8-13/G.992.3 – PMD function control parameters included in R-MSG1

Octet Nr [i]	Parameter	PMD format bits [8 × i + 7 to 8 × i + 0]
0	BIMAXus	[0000 xxxx], bit 3 to 0
1	EXTGIus	[xxxx xxxx], bit 7 to 0
2	CA-MEDLEYds	[00xx xxxx], bit 5 to 0

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'171 Patent, Claim 2	ADSL2/+
2. [**Infringement Scenario #2**] In a multicarrier transceiver, a variable state length initialization method comprising:	Products compliant with the ITU-T Recommendation G.992.3 standard comprise a transceiver – a device that both transmits and receives – that establishes a communication link with a transceiver of another product compliant with the ITU-T Recommendation G.992.3 standard using a prescribed method. ITU-T Recommendation G.992.3 (2005) Summary (p. i). "ATU," "ATU-C," and "ATU-R" are accepted abbreviations for the transceivers. ITU-T Recommendation G.992.3 (2005) § 4 (p. 6) ("ATU-C [is an abbreviation for] ATU at the central office end (i.e., network operator)," and "ATU-R [is an abbreviation for] ATU at the remote terminal end (i.e., CP)."). A transceiver transmits and receives a multicarrier signal. The transceiver produces this signal by modulating signal constellation points on multiple subcarrier frequencies and summing the result into a DMT symbol for simultaneous transmission. ITU-T Recommendation G.992.3 (2005) §§ 8.8 (p. 89) and 8.8.1 (p. 89). **8.8 Modulation** The modulator shall modulate a constellation encoder output data frame or sync frame (containing $NSC-1$ complex values Z_i, $i=1$ to $NSC-1$) into a DMT symbol. The data frame can be taken **8.8.1 Subcarriers** A DMT symbol consists of a set of subcarriers, with index $i=0$ to NSC. The DMT subcarriers spacing Δf, shall be 4.3125 kHz, with a tolerance of $\pm$ 50 ppm. The subcarrier frequencies shall be An ATU-C establishes a communication link with an ATU-R. ITU-T Recommendation G.992.3 (2005) § 8.13.1.1 (p. 104). **8.13.1.1 Basic functions of initialization** ADSL transceiver initialization is required in order for a physically connected ATU-R and ATU-C pair to establish a communications link. The procedures for initiating a connection are specified in A transceiver uses the initialization method specified in ITU-T Recommendation G.993.2 for both full (§ 8.13) and short (§ 8.14) initialization, which are variable state length initializations because, for some initialization states, the transceiver can change the length of the initialization state by performing the steps recited in the body of the claim. ITU-T Recommendation G.992.3 (2005) § 8.13.7 (p. 143).
[a] transmitting to a second multicarrier transceiver information identifying a first value that is used to determine a first minimum number of multicarrier symbols;	The ATU-C transmits the information C-MSG-FMT that identifies a first value (FMT_C-REVERB4). This first value is used to determine a first minimum number of multicarrier symbols, 256 or 1024. ITU-T Recommendation G.992.3 (2005) §§ 8.13.4.1.8 (p. 131) and 8.13.3.1.10 (p. 120), and Table 8-26 (p. 120). C-REVERB symbols. The value $LEN\_C\text{-}REVERB4$ shall be equal to 1024 if the ATU-C or the ATU-R (or both) have set $FMT\_C\text{-}REVERB4$ to 1 in the C-MSG-FMT or R-MSG-FMT message respectively. The value $LEN\_C\text{-}REVERB4$ shall be equal to 256 otherwise.

'171 Patent, Claim 2	ADSL2/+
	8.13.3.1.10 C-MSG-FMT The C-MSG-FMT state is of fixed length. In the C-MSG-FMT state, the ATU-C shall transmit 96 symbols of C-COMB or C-ICOMB to modulate the C-MSG-FMT message and CRC. The C-MSG-FMT message conveys information about the presence, format and length of subsequent ATU-C and ATU-R messages. The C-MSG-FMT message, m, is defined by: $$m = \{m_{15}, \ldots, m_0\}$$ Bits shall be defined as shown in Table 8-26.

Table 8-26/G.992.3 – Bit definition for the C-MSG-FMT message

Bit index	Parameter	Definition
0	FMT_R-REVERB1 (value 0 or 1)	Set to 1 indicates that the ATU-C requests an extended duration of the R-REVERB1 state. Set to 0 indicates it does not.
1		Reserved, set to 0.
2	FMT_C-REVERB4 (value 0 or 1)	Set to 1 indicates that the ATU-C requests an extended duration of the C-REVERB4 state. Set to 0 indicates it does not.

'171 Patent, Claim 2	ADSL2/+
[b] receiving from the second multicarrier transceiver information identifying a second value that is used to determine a second minimum number of multicarrier symbols;	The ATU-C (**Infringement Case #1**) receives the information R-MSG-FMT that identifies a second value (FMT-C-REVERB4). This second value is used to determine a second minimum number of multicarrier symbols, 256 or 1024. ITU-T Recommendation G.992.3 (2005) §§ 8.13.4.1.8 (p. 131) and 8.13.3.2.10 (p. 125), and Table 8-31 (p. 126). C-REVERB symbols. The value LEN_C-REVERB4 shall be equal to 1024 if the ATU-C or the ATU-R (or both) have set FMT_C-REVERB4 to 1 in the C-MSG-FMT or R-MSG-FMT message respectively. The value LEN_C-REVERB4 shall be equal to 256 otherwise. **8.13.3.2.10 R-MSG-FMT** The R-MSG-FMT state is of fixed length. In the R-MSG-FMT state, the ATU-R shall transmit 96 symbols of R-COMB or R-ICOMB to modulate the R-MSG-FMT message and CRC. The R-MSG-FMT message conveys information about the presence, format and length of subsequent ATU-C and ATU-R messages. The R-MSG-FMT message, m, is defined by: $$m = \{m_{15}, \ldots, m_0\}$$ Bits shall be defined as shown in Table 8-31.

Table 8-31/G.992.3 – Bit definition for the R-MSG-FMT message

Bit index	Parameter	Definition
0	FMT-R-REVERB1 (value 0 or 1)	Set to 1 indicates that the ATU-R requests an extended duration of the R-REVERB1 state. Set to 0 indicates it does not.
1		Reserved, set to 0.
2	FMT-C-REVERB4 (value 0 or 1)	Set to 1 indicates that the ATU-R requests an extended duration of the C-REVERB4 state. Set to 0 indicates it does not.

'171 Patent, Claim 2	ADSL2/+
[c] selecting the greater of the first minimum number of multicarrier symbols and the second minimum number of	The ATU-C selects the number of multicarrier symbols, LEN_C-REVERB4, based on the values of FMT_C-REVERB4 that are part of the C-MSG-FMT and R-MSG-FMT messages. ITU-T Recommendation G.992.3 (2005) § 8.13.4.1.8 (p. 131).

'171 Patent, Claim 2	ADSL2/+
multicarrier symbols; and	C-REVERB symbols. The value *LEN_C-REVERB4* shall be equal to 1024 if the ATU-C or the ATU-R (or both) have set *FMT_C-REVERB4* to 1 in the C-MSG-FMT or R-MSG-FMT message respectively. The value *LEN_C-REVERB4* shall be equal to 256 otherwise. As explained in Section 8.13.4.1.8, the value of LEN_C-REVERB4, the number of symbols in C-REVERB4, depends on the values of FMT_C-REVERB4 in the C-MSG-FMT and R-MSG-FMT messages. For example, if one value of FMT_C-REVERB4 is equal to 1 while the other value of FMT_C-REVERB4 is equal to 0, then the ATU-C will select the greater of a first (or second) minimum value of 1024 and a second (or first) minimum value of 256. The ATU-C will select 1024 to be the value of LEN_C-REVERB4 because it is the greater of the two requested minimums. ITU-T Recommendation G.992.3 (2005) Tables 8-26 (p. 120) and 8-31 (p. 126). **Table 8-26/G.992.3 – Bit definition for the C-MSG-FMT message** 	Bit index	Parameter	Definition
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0	*FMT_R-REVERB1* (value 0 or 1)	Set to 1 indicates that the ATU-C requests an extended duration of the R-REVERB1 state. Set to 0 indicates it does not.
1		Reserved, set to 0.
2	*FMT_C-REVERB4* (value 0 or 1)	Set to 1 indicates that the ATU-C requests an extended duration of the C-REVERB4 state. Set to 0 indicates it does not. | **Table 8-31/G.992.3 – Bit definition for the R-MSG-FMT message** | Bit index	Parameter	Definition
---	---	---
0	*FMT-R-REVERB1* (value 0 or 1)	Set to 1 indicates that the ATU-R requests an extended duration of the R-REVERB1 state. Set to 0 indicates it does not.
1		Reserved, set to 0.
2	*FMT-C-REVERB4* (value 0 or 1)	Set to 1 indicates that the ATU-R requests an extended duration of the C-REVERB4 state. Set to 0 indicates it does not.	
[d] transmitting to the second multicarrier transceiver, during an initialization state, the selected number of multicarrier symbols.	The ATU-C transmits the selected number (LEN_C-REVERB4) of multicarrier symbols during the C-REVERB4 initialization state. ITU-T Recommendation G.992.3 (2005) § 8.13.4.1.8 (p. 131). **8.13.4.1.8 C-REVERB4** The C-REVERB4 state is of fixed length. In this state, the ATU-C shall transmit *LEN_C-REVERB4* C-REVERB symbols. The value *LEN_C-REVERB4* shall be equal to 1024 if the ATU-C or the

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'171 Patent, Claim 3	ADSL2/+
3. [**Infringement Scenario #2**] In a multicarrier transceiver, a variable state length initialization method comprising:	Products compliant with the ITU-T Recommendation G.992.3 standard comprise a transceiver – a device that both transmits and receives – that establishes a communication link with a transceiver of another product compliant with the ITU-T Recommendation G.992.3 standard using a prescribed method. ITU-T Recommendation G.992.3 (2005) Summary (p. i). "ATU," "ATU-C," and "ATU-R" are accepted abbreviations for the transceivers. ITU-T Recommendation G.992.3 (2005) § 4 (p. 6) ("ATU-C [is an abbreviation for] ATU at the central office end (i.e., network operator)," and "ATU-R [is an abbreviation for] ATU at the remote terminal end (i.e., CP)."). A transceiver transmits and receives a multicarrier signal. The transceiver produces this signal by modulating signal constellation points on multiple subcarrier frequencies and summing the result into a DMT symbol for simultaneous transmission. ITU-T Recommendation G.992.3 (2005) §§ 8.8 (p. 89) and 8.8.1 (p. 89). **8.8 Modulation** The modulator shall modulate a constellation encoder output data frame or sync frame (containing $NSC-1$ complex values Z_i, $i=1$ to $NSC-1$) into a DMT symbol. The data frame can be taken **8.8.1 Subcarriers** A DMT symbol consists of a set of subcarriers, with index $i=0$ to NSC. The DMT subcarriers spacing Δf, shall be 4.3125 kHz, with a tolerance of $\pm$ 50 ppm. The subcarrier frequencies shall be An ATU-C establishes a communication link with an ATU-R. ITU-T Recommendation G.992.3 (2005) § 8.13.1.1 (p. 104). **8.13.1.1 Basic functions of initialization** ADSL transceiver initialization is required in order for a physically connected ATU-R and ATU-C pair to establish a communications link. The procedures for initiating a connection are specified in A transceiver uses the initialization method specified in ITU-T Recommendation G.993.2 for both full (§ 8.13) and short (§ 8.14) initialization, which are variable state length initializations because, for some initialization states, the transceiver can change the length of the initialization state by performing the steps recited in the body of the claim. ITU-T Recommendation G.992.3 (2005) § 8.13.7 (p. 143).
[a] transmitting to a second multicarrier transceiver information identifying a first value that is used to determine a first minimum number of multicarrier symbols;	The ATU-C (**Infringement Case #1**) transmits the information C-MSG-FMT that identifies a first value (FMT_R-REVERB1). This first value is used to determine a first minimum number of multicarrier symbols, 272 or 592. ITU-T Recommendation G.992.3 (2005) §§ 8.13.4.2.1 (p. 131) and 8.13.3.1.10 (p. 120), and Table 8-26 (p. 120). *LEN_R-REVERB1* R-REVERB symbols. The value *LEN_R-REVERB1* shall be equal to 592 if the ATU-C or the ATU-R (or both) have set *FMT_R-REVERB1* to 1 in the C-MSG-FMT or R-MSG-FMT message respectively. The value *LEN_R-REVERB1* shall be equal to 272 otherwise.

'171 Patent, Claim 3	ADSL2/+
	8.13.3.1.10 C-MSG-FMT The C-MSG-FMT state is of fixed length. In the C-MSG-FMT state, the ATU-C shall transmit 96 symbols of C-COMB or C-ICOMB to modulate the C-MSG-FMT message and CRC. The C-MSG-FMT message conveys information about the presence, format and length of subsequent ATU-C and ATU-R messages. The C-MSG-FMT message, m, is defined by: $$m = \{m_{15}, \dots, m_0\}$$ Bits shall be defined as shown in Table 8-26. **Table 8-26/G.992.3 – Bit definition for the C-MSG-FMT message** <table><tr><th>Bit index</th><th>Parameter</th><th>Definition</th></tr><tr><td>0</td><td>*FMT_R-REVERB1* (value 0 or 1)</td><td>Set to 1 indicates that the ATU-C requests an extended duration of the R-REVERB1 state. Set to 0 indicates it does not.</td></tr><tr><td>1</td><td></td><td>Reserved, set to 0.</td></tr><tr><td>2</td><td>*FMT_C-REVERB4* (value 0 or 1)</td><td>Set to 1 indicates that the ATU-C requests an extended duration of the C-REVERB4 state. Set to 0 indicates it does not.</td></tr></table> The ATU-C (**Infringement Case #2**) transmits the information C-MSG-FMT that identifies a first value (FMT_C-REVERB4). This first value is used to determine a first minimum number of multicarrier symbols, 256 or 1024. ITU-T Recommendation G.992.3 (2005) §§ 8.13.4.1.8 (p. 131) and 8.13.3.1.10 (p. 120), and Table 8-26 (p. 120). C-REVERB symbols. The value *LEN_C-REVERB4* shall be equal to 1024 if the ATU-C or the ATU-R (or both) have set *FMT_C-REVERB4* to 1 in the C-MSG-FMT or R-MSG-FMT message respectively. The value *LEN_C-REVERB4* shall be equal to 256 otherwise.
[b] receiving from the second multicarrier transceiver information identifying a second value that is used to determine a second minimum number of multicarrier symbols;	The ATU-C (**Infringement Case #1**) receives the information R-MSG-FMT that identifies a second value (FMT-R-REVERB1). This second value is used to determine a second minimum number of multicarrier symbols, 272 or 592. ITU-T Recommendation G.992.3 (2005) §§ 8.13.4.2.1 (p. 131) and 8.13.3.2.10 (p. 125), and Table 8-31 (p. 126). *LEN_R-REVERB1* R-REVERB symbols. The value *LEN_R-REVERB1* shall be equal to 592 if the ATU-C or the ATU-R (or both) have set *FMT_R-REVERB1* to 1 in the C-MSG-FMT or R-MSG-FMT message respectively. The value *LEN_R-REVERB1* shall be equal to 272 otherwise. **8.13.3.2.10 R-MSG-FMT** The R-MSG-FMT state is of fixed length. In the R-MSG-FMT state, the ATU-R shall transmit 96 symbols of R-COMB or R-ICOMB to modulate the R-MSG-FMT message and CRC. The R-MSG-FMT message conveys information about the presence, format and length of subsequent ATU-C and ATU-R messages. The R-MSG-FMT message, m, is defined by: $$m = \{m_{15}, \dots, m_0\}$$ Bits shall be defined as shown in Table 8-31.

'171 Patent, Claim 3	ADSL2/+
	Table 8-31/G.992.3 – Bit definition for the R-MSG-FMT message 	Bit index	Parameter	Definition
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0	FMT-R-REVERB1 (value 0 or 1)	Set to 1 indicates that the ATU-R requests an extended duration of the R-REVERB1 state. Set to 0 indicates it does not.
1		Reserved, set to 0.
2	FMT-C-REVERB4 (value 0 or 1)	Set to 1 indicates that the ATU-R requests an extended duration of the C-REVERB4 state. Set to 0 indicates it does not.	 The ATU-C (**Infringement Case #2**) receives the information R-MSG-FMT that identifies a second value (FMT-C-REVERB4). This second value is used to determine a second minimum number of multicarrier symbols, 256 or 1024. ITU-T Recommendation G.992.3 (2005) §§ 8.13.4.1.8 (p. 131) and 8.13.3.2.10 (p. 125), and Table 8-31 (p. 126). C-REVERB symbols. The value *LEN_C-REVERB4* shall be equal to 1024 if the ATU-C or the ATU-R (or both) have set *FMT_C-REVERB4* to 1 in the C-MSG-FMT or R-MSG-FMT message respectively. The value *LEN_C-REVERB4* shall be equal to 256 otherwise.
[c] selecting the greater of the first minimum number of multicarrier symbols and the second minimum number of multicarrier symbols; and	The ATU-C (**Infringement Case #1**) selects the number of multicarrier symbols, LEN_R-REVERB1, based on the values of FMT_R-REVERB1 that are part of the C-MSG-FMT and R-MSG-FMT messages. ITU-T Recommendation G.992.3 (2005) § 8.13.4.2.1 (p. 128). *LEN_R-REVERB1* R-REVERB symbols. The value *LEN_R-REVERB1* shall be equal to 592 if the ATU-C or the ATU-R (or both) have set *FMT_R-REVERB1* to 1 in the C-MSG-FMT or R-MSG-FMT message respectively. The value *LEN_R-REVERB1* shall be equal to 272 otherwise. For **Infringement Case #1**, as explained in Section 8.13.4.2.1, the value of LEN_R-REVERB1, the number of symbols in R-REVERB1, depends on the values of FMT_R-REVERB1 in the C-MSG-FMT and R-MSG-FMT messages. For example, if one value of FMT_R-REVERB1 is equal to 1 while the other value of FMT_R-REVERB1 is equal to 0, then the ATU-C will select the greater of a first (or second) minimum value of 592 and a second (or first) minimum value of 272. The ATU-C will select 592 to be the value of LEN_R-REVERB1 because it is the greater of the two requested minimums. ITU-T Recommendation G.992.3 (2005) Tables 8-26 (p. 120) and 8-31 (p. 126). **Table 8-26/G.992.3 – Bit definition for the C-MSG-FMT message** 	Bit index	Parameter	Definition
---	---	---
0	FMT_R-REVERB1 (value 0 or 1)	Set to 1 indicates that the ATU-C requests an extended duration of the R-REVERB1 state. Set to 0 indicates it does not.
1		Reserved, set to 0.
2	FMT_C-REVERB4 (value 0 or 1)	Set to 1 indicates that the ATU-C requests an extended duration of the C-REVERB4 state. Set to 0 indicates it does not. | **Table 8-31/G.992.3 – Bit definition for the R-MSG-FMT message** | Bit index	Parameter	Definition
---	---	---
0	FMT-R-REVERB1 (value 0 or 1)	Set to 1 indicates that the ATU-R requests an extended duration of the R-REVERB1 state. Set to 0 indicates it does not.
1		Reserved, set to 0.
2	FMT-C-REVERB4 (value 0 or 1)	Set to 1 indicates that the ATU-R requests an extended duration of the C-REVERB4 state. Set to 0 indicates it does not.	

- 13 -

'171 Patent, Claim 3	ADSL2/+
	The ATU-C (**Infringement Case #2**) selects the number of multicarrier symbols, LEN_C-REVERB4, based on the values of FMT_C-REVERB4 that are part of the C-MSG-FMT and R-MSG-FMT messages. ITU-T Recommendation G.992.3 (2005) § 8.13.4.1.8 (p. 131). C-REVERB symbols. The value *LEN_C-REVERB4* shall be equal to 1024 if the ATU-C or the ATU-R (or both) have set *FMT_C-REVERB4* to 1 in the C-MSG-FMT or R-MSG-FMT message respectively. The value *LEN_C-REVERB4* shall be equal to 256 otherwise. For **Infringement Cases #2**, as explained in Section 8.13.4.1.8, the value of LEN_C-REVERB4, the number of symbols in C-REVERB4, depends on the values of FMT_C-REVERB4 in the C-MSG-FMT and R-MSG-FMT messages. For example, if one value of FMT_C-REVERB4 is equal to 1while the other value of FMT_C-REVERB4 is equal to 0, then the ATU-C (**Infringement Case #2**) will select the greater of a first (or second) minimum value of 1024 and a second (or first) minimum value of 256. In **Infringement Cases #2** the ATU will select 1024 to be the value of LEN_C-REVERB4 because it is the greater of the two requested minimums. ITU-T Recommendation G.992.3 (2005) Tables 8-26 (p. 120) and 8-31 (p. 126).
[d] receiving from the second multicarrier transceiver, during an initialization state, the selected number of multicarrier symbols.	The ATU-C (**Infringement Case #1**) receives the selected number (LEN_R-REVERB1) of multicarrier symbols during the R-REVERB1 initialization state. ITU-T Recommendation G.992.3 (2005) § 8.13.4.2.1 (p. 131). **8.13.4.2.1 R-REVERB1** The R-REVERB1 state is of fixed length. In the R-REVERB1 state, the ATU-R shall transmit *LEN_R-REVERB1* R-REVERB symbols. The value *LEN_R-REVERB1* shall be equal to 592 if the The ATU-C (**Infringement Case #2**) receives the selected number (LEN_C-REVERB4) of multicarrier symbols during the R-REVERB4 initialization state. ITU-T Recommendation G.992.3 (2005) § 8.13.4.2.7 (p. 133). **8.13.4.2.7 R-REVERB4** The R-REVERB4 state is of variable length. In this state, the ATU-R shall transmit a minimum of *LEN_C-REVERB4* and a maximum of *LEN_C-REVERB4* + 80 R-REVERB symbols, where LEN_C-REVERB4 is defined in 8.13.4.1.8.

Electronic Proof of Claim_OMWKX28783

Final Audit Report   2020-08-18

Created:	2020-08-18
By:	Prime Clerk (epoc@primeclerk.com)
Status:	Signed
Transaction ID:	CBJCHBCAABAAj0YE7ZOtx5cFmVs4NfdKoE3gKpdEHbJs

"Electronic Proof of Claim_OMWKX28783" History

Web Form created by Prime Clerk (epoc@primeclerk.com)
2020-08-18 - 3:27:01 PM GMT

/s/ G. Eric Brunstad, Jr. (eric.brunstad@dechert.com) uploaded the following supporting documents:
   Attachment
2020-08-18 - 3:34:23 PM GMT

Web Form filled in by /s/ G. Eric Brunstad, Jr. (eric.brunstad@dechert.com)
2020-08-18 - 3:34:23 PM GMT- IP address: 204.155.230.3

(User email address provided through API User-Agent: Mozilla/5.0 (Windows NT 6.3; Win64; x64)
AppleWebKit/537.36 (KHTML, like Gecko) Chrome/84.0.4147.125 Safari/537.36)
2020-08-18 - 3:34:26 PM GMT- IP address: 204.155.230.3

Signed document emailed to Prime Clerk (epoc@primeclerk.com) and /s/ G. Eric Brunstad, Jr.
(eric.brunstad@dechert.com)
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Prime Clerk   POWERED BY Adobe Sign

<u>Exhibit C</u>

Letter from J. Plies to Frontier dated Dec. 18, 2020

Dechert
LLP

515 Congress Avenue
Suite 1400
Austin, TX 78701
+1 512 394 3000 Main
+1 512 394 3001 Fax
www.dechert.com

JEFFREY B. PLIES

jeffrey.plies@dechert.com
+1 512 394 3012 Direct
+1 394 394 3980 Fax

December 18, 2020

VIA email: FTRClaims@kirkland.com

Frontier Communications Corp.
Legal Department, Licensing Division
c/o Kirkland & Ellis LLP, Counsel to Debtor

Re: Statement for Reconciliation of Claim (Case No. 20-22476, Bankr. S.D.N.Y.)

Frontier Legal Department,

Pursuant to the Notice filed by Frontier Communications Corp. and its debtor affiliates (collectively, "Frontier" or the "Debtors") on November 25, 2020 (D.I. 1367), Intellectual Ventures II LLC ("IV") provides this statement to begin the claim-reconciliation process.

As set forth in IV's Proof of Claim No. 2526[1], the Debtors have infringed five U.S. patents owned by IV that pertain to digital subscriber line (DSL) internet access services. These patents read on certain industry standards promulgated by the International Telecommunications Union (ITU) and implemented by Frontier in its digital subscriber line access multiplexers (DSLAM's). Exemplary claim charts presenting some of the grounds for infringement were attached to the proofs of claim.

IV previously asserted four of these patents against a similarly-situated competitor of Frontier's. That litigation resulted in a patent license agreement. Based on IV's previous licensing terms, Frontier owes IV pre-petition compensation of $2.71 per subscriber. Given that Frontier's SEC filings report that there are 3.48 million subscribers through April 2020, Frontier owes IV royalty damages in the amount of $9,396,000 for its pre-petition infringement. Additionally, IV has a post-petition claim for Frontier's continuing infringement.

To the extent necessary we would be happy to meet with you to discuss IV's claim. IV would prefer to reach an agreement with Frontier as to the allowance and amount of the claim without involving the Court. However, to the extent that is not possible, IV will seek adjudication by the Bankruptcy Court. In such an event, we believe the parties should work in good faith to prepare an efficient resolution procedure and schedule that can be submitted to the Court. We look forward to your response.

Regards,

Jeffrey Plies
Counsel for Intellectual Ventures

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[1] Note that for completeness, IV filed identical proofs of claim for each debtor entity.

Exhibit D

IV Administrative Request

Hearing Date: To Be Determined
Objection Deadline: August 2, 2021 at 4:00 p.m. (Eastern Time)

Martin J. Black (*pro hac vice* application pending)
Jeffrey B. Plies (*pro hac vice* application pending)
David A. Herman
DECHERT LLP
1095 Avenue of the Americas
New York, NY 10036
Phone: (212) 698-3500
Facsimile: (212) 698-3599
Email: martin.black@dechert.com
        jeffrey.plies@dechert.com
        david.herman@dechert.com

Counsel to Intellectual Ventures II LLC

UNITED STATES BANKRUPTCY COURT
SOUTHERN DISTRICT OF NEW YORK

In re:	**Chapter 11**
FRONTIER COMMUNICATIONS CORPORATION, *et al.*,[1]	**Case No. 20-22476 (RDD)**
Debtors.	**(Jointly Administered)**

NOTICE OF REQUEST FOR PAYMENT OF ADMINISTRATIVE
EXPENSE FOR POST-PETITION INFRINGEMENT OF
PATENTS HELD BY INTELLECTUAL VENTURES II LLC

PLEASE TAKE NOTICE that a hearing (the "Hearing") on the attached Request for

Payment of Administrative Expense for Post-Petition Infringement of Patents Held by Intellectual

Ventures II LLC (the "Request for Payment") will be held before the Honorable Robert D. Drain,

United States Bankruptcy Judge, at the United States Bankruptcy Court for the Southern District

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[1] The last four digits of Debtor Frontier Communications Corporation's tax identification number are 9596. Due to the large number of debtor entities in these chapter 11 cases, for which joint administration has been granted, a complete list of the debtor entities and the last four digits of their federal tax identification numbers are not provided herein. A complete list of such information may be obtained on the website of the Debtors' proposed claims and noticing agent at https://cases.primeclerk.com/ftr. The location of the Debtors' service address for purposes of these chapter 11 cases is: 50 Main Street, Suite 1000, White Plains, New York 10606.

of New York, 300 Quarropas Street, White Plains, NY 10601-4140 (the "Bankruptcy Court") at a

date and time to be determined. In accordance with General Order M-543 dated March 20, 2020,

the Hearing will be conducted telephonically. Any parties wishing to participate must make

arrangements through Court Solutions by visiting https://www.court-solutions.com.

      PLEASE TAKE FURTHER NOTICE that objections, if any, to the relief sought in the

Request for Payment shall be in writing, state with particularity the basis for the objection and be

filed with the Bankruptcy Court in accordance with the Local Rules by users of the Bankruptcy

Court's case filing system, and by all other parties by electronic service, with a hard copy to

Chambers, and served in accordance with the Local Rules and the Case Management Procedures

(ECF 390) and upon counsel to (i) Intellectual Ventures II LLC, Dechert LLP, Three Bryant Park,

1095 Avenue of the Americas, New York, NY 10036-6797, Attn: Martin J. Black, Esq., Jeffrey

B. Plies, Esq., and David A. Herman, Esq.; (ii) the Debtors, Kirkland & Ellis LLP, 601 Lexington

Avenue, New York, New York, 10153, Attn: Stephen E. Hessler, Esq., Mark McKane, Esq., and

Patrick Venter, Esq.; (iii) counsel to the unsecured creditors' committee, Kramer Levin Naftalis &

Frankel LLP, 1177 Avenue of the Americas, New York, New York 10036, Attn: Douglas H.

Mannal, Esq., Jennifer Sharret, Esq., and Megan Wasson, Esq.; and (iv) the Office of the United

States Trustee for the Southern District of New York, 201 Varick Street, Room 1006, New York,

New York 10014, so as to be received no later than August 2, 2021 at 4:00 p.m. (the "Objection

Deadline").

      PLEASE TAKE FURTHER NOTICE that if an objection to the Request for Payment is

not received by the Objection Deadline, the relief requested shall be deemed unopposed, and the

Bankruptcy Court may enter an order granting the relief sought without a hearing.

Martin J. Black (*pro hac vice* application pending)
Jeffrey B. Plies (*pro hac vice* application pending)
David A. Herman
DECHERT LLP
1095 Avenue of the Americas
New York, NY 10036
Phone: (212) 698-3500
Facsimile: (212) 698-3599
Email: martin.black@dechert.com
    jeff.plies@dechert.com
    david.herman@dechert.com

Counsel to Intellectual Ventures II LLC

UNITED STATES BANKRUPTCY COURT
SOUTHERN DISTRICT OF NEW YORK

In re:	**Chapter 11**
FRONTIER COMMUNICATIONS CORPORATION, *et al.*,[2]	**Case No. 20-22476 (RDD)**
Debtors.	**(Jointly Administered)**

REQUEST FOR PAYMENT OF ADMINISTRATIVE EXPENSE FOR POST-PETITION INFRINGEMENT OF PATENTS HELD BY INTELLECTUAL VENTURES II LLC

Intellectual Ventures II LLC ("IV") hereby files this Request for Payment from Frontier

Communications Corporation and its debtor affiliates (collectively, "Frontier" or the "Debtors"),

in the amount of $1,699,102, plus trebling and attorneys' fees, for the Debtors' infringement of

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[2] The last four digits of Debtor Frontier Communications Corporation's tax identification number are 9596. Due to the large number of debtor entities in these chapter 11 cases, for which joint administration has been granted, a complete list of the debtor entities and the last four digits of their federal tax identification numbers are not provided herein. A complete list of such information may be obtained on the website of the Debtors' proposed claims and noticing agent at https://cases.primeclerk.com/ftr. The location of the Debtors' service address for purposes of these chapter 11 cases is: 50 Main Street, Suite 1000, White Plains, New York 10606.

patent assets held by IV between the commencement of these chapter 11 cases (the "Petition Date")

and the Effective Date of the Debtors' Plan.[3]

IV'S ASSERTED PATENTS

1.   IV owns all substantial right, title, and interest in the following U.S. patents (the

"Asserted Patents"):

2.   On November 11, 2003, United States Patent No. 6,647,068 (the "'068 Patent"),

titled "Variable State Length Initialization," was duly and lawfully issued by the United States

Patent and Trademark Office (the "PTO").

3.   On September 28, 2004, United States Patent No. 6,798,735 (the "'735 Patent"),

titled "Adaptive Allocation for Variable Bandwidth Multicarrier Communication," was duly and

lawfully issued by the PTO.

4.   On September 18, 2007, United States Patent No. 7,272,171 (the "'171 Patent"),

titled "Variable State Length Initialization," was duly and lawfully issued by the PTO.

5.   On October 19, 2010, United States Patent No. 7,817,532 (the "'532 Patent"), titled

"Adaptive Allocation for Variable Bandwidth Multicarrier Communication," was duly and

lawfully issued by the PTO.

6.   On February 5, 2013, United States Patent No. 8,369,275 (the "'275 Patent"), titled

"Adaptive Allocation for Variable Bandwidth Multicarrier Communication," was duly and

lawfully issued by the PTO.

FRONTIER'S INFRINGEMENT

7.   The Debtors have infringed and are continuing to infringe the Asserted Patents as

follows:

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[3] Capitalized terms not otherwise defined herein shall have the meanings given to them in the *Notice of (I) Entry of Confirmation Order, (II) Occurrence of Effective Date, and (III) Related Bar Dates* (ECF 1793).

8.   During the period subsequent to the Petition Date, Frontier has been infringing at

least claims 7, 8, 16, and 17 of the '068 Patent and claims 2 and 3 of the '171 Patent under 35

U.S.C. Section 271, by Frontier's use of at least the Adtran 1248, Adtran 1148, Adtran TA5000,

Adtran TA3000, Alcatel 7300, Calix E5, Calix E7, Calix C7 digital subscriber line access

multiplexers (DSLAMs), implementing VDSL2 and/or ADSL2/2+ technical communications

standards promulgated by the International Telecommunication Union (ITU-T).

9.   Exemplary claim charts outlining how Frontier has been infringing the '068 and

'171 Patents through Frontier's use of products implementing particular ITU-T technical standards

were previously submitted as supporting documentation to IV's proofs of claim with respect to

Frontier's prepetition infringement and are hereby incorporated by reference as if fully recited

herein. *See, e.g.*, Claim No. 2526.[4]

IV'S CLAIM FOR ROYALTY DAMAGES BASED ON FRONTIER'S INFRINGEMENT

10.   IV is party to a Patent License Agreement executed by one of Frontier's similarly-

situated competitors, in which Frontier's competitor agreed to license, *inter alia*, the Asserted

Patents (the "Competitor License").[5]

11.   IV and Frontier's competitor executed the Competitor License following IV's

assertion of the '068 and '171 patents in prior litigation against Frontier's competitor.

12.   The terms of the Competitor License are comparable to those that Frontier owes to

IV as compensation for its infringement of IV's patents.

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[4] IV submitted the following proofs of claim: 2365, 2366, 2367, 2371, 2401, 2407, 2415, 2433, 2453, 2461, 2469, 2472, 2513, 2514, 2519, 2521, 2526, 2529, 2532, 2535, 2536, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2547, 2548, 2549, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2562, 2563, 2564, 2566, 2567, 2568, 2570, 2571, 2572, 2574, 2575, 2577, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2597, 2598, 2599, 2600, 260, 2602, 2603, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2615, 2616, 2617, 2618, 2619, 2621, 2622, 2624, 2625, 2626, 2627, 2628, 2630, 2631, 2632, 2633, 2634, 2671.
[5] The Competitor License has been produced to counsel for the Debtors pursuant to the Court's protective order.

13.   Based on the royalty terms of the Competitor License, the date of Frontier's commencement of these chapter 11 cases, and the date the Plan became effective, Frontier owes IV a royalty of $0.488 per subscriber as compensation for Frontier's post-petition infringement of the '068 and '171 patents through the Effective Date.

14.   Frontier's May 6, 2020 SEC 10-Q filing reports that as of March 31, 2020, Frontier had 3.48 million DSL subscribers.

15.   For the period beginning April 14, 2020 (the Petition Date) through April 30, 2021 (the Effective Date), Frontier accordingly owes to IV royalty damages of $1,699,102.

16.   The Debtors' infringement subsequent to the filing of IV's prepetition proofs of claim has been willful. IV's proofs of claim provided the Debtors with knowledge of the '068 and '171 patents, allegations of infringement, and detailed claim charts explaining how the Debtors have been infringing the patent claims. Nevertheless, the Debtors have failed to abate or mitigate their infringement. Pursuant to 35 U.S.C. § 284, IV requests that the amount of royalty damages be increased by three times. Additionally, the Debtors' continued infringement in the wake of IV's proofs of claim makes this an exceptional case, and IV should be awarded its attorneys' fees pursuant to 35 U.S.C. § 285 or as otherwise permitted by law.

17.   IV also requests that the Court award it ongoing running royalties for any infringement by Frontier subsequent to the Effective Date of the Plan up until expiration of the '068 and '171 patents.

18.   Under established law, such damages for post-petition patent infringement are treated as administrative expenses under the Bankruptcy Code.[6] *See, e.g.*, *Reading Co. v. Brown*,

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[6] The Debtors' liability for post-petition patent infringement arises in the ordinary course of the Debtors' businesses and, accordingly, under paragraph 103 of the Confirmation Order and Article II, Section A of the Plan, IV is not required to file this Request for Payment by the administrative claims bar date. *See Sanchez v. Nw. Airlines, Inc.*, 659 F.3d 671, 677 (8th Cir. 2011). IV files this Request for Payment, however, in an abundance of caution.

4

391 U.S. 471, 482-83 (1968); *In re Eagle-Picher Indus., Inc.*, 447 F.3d 461, 464 (6th Cir. 2006) (collecting authority); *Carter-Wallace, Inc. v. Otte*, 474 F.2d 529, 533 (2d Cir. 1972).

RESERVATION OF RIGHTS

19.   IV reserves all rights to pursue, and intends to pursue, all available remedies for Frontier's continuing infringement of the '068 and '171 Patents.

20.   This Request for Payment is without prejudice to any other claim or cause of action that IV or its affiliates may have against Frontier and/or any affiliated, parent, and/or subsidiary entities.

CONCLUSION

21.   For the reasons set forth above, IV respectfully requests allowance and payment of $1,699,102, plus trebling and attorneys' fees, as an administrative expense for the Debtors' post-petition patent infringement through the Effective Date of the Plan.

DATED: June 1, 2021   Respectfully submitted,

                                         /s/ David A. Herman
                                         Martin J. Black (*pro hac vice* application pending)
                                         Jeffrey B. Plies (*pro hac vice* application pending)
                                         David A. Herman
                                         DECHERT LLP
                                         1095 Avenue of the Americas
                                         New York, NY 10036
                                         Phone: (212) 698-3500
                                         Facsimile: (212) 698-3599
                                         Email: martin.black@dechert.com
                                              jeffrey.plies@dechert.com
                                              david.herman@dechert.com

                                         Counsel to Intellectual Ventures II LLC

<u>CERTIFICATE OF SERVICE</u>

I hereby certify that on June 1, 2021, I electronically filed the foregoing with the Clerk of

the Court using the CM/ECF system, which will send a notification of such filing to all ECF

recipients in the above-captioned matter.

DATED: June 1, 2021

Respectfully submitted,

/s/ David A. Herman
Martin J. Black (*pro hac vice* application pending)
Jeffrey B. Plies (*pro hac vice* application pending)
David A. Herman
DECHERT LLP
1095 Avenue of the Americas
New York, NY 10036
Phone: (212) 698-3500
Facsimile: (212) 698-3599
Email: martin.black@dechert.com
      jeffrey.plies@dechert.com
      david.herman@dechert.com

Counsel to Intellectual Ventures II LLC